

River Marsh – Pembroke MA

Comprehensive Permit Application

Town of Pembroke, Massachusetts
ZONING BOARD OF APPEALS

Table of Contents

1. Application for Comprehensive Permit
2. Preliminary Site Development Plans
3. Report on Existing Site Conditions
4. Drainage Calculations and Stormwater Management Plan dated September 7, 2018
5. Preliminary Scaled Architectural Drawings
6. Tabulation of Proposed Buildings
7. Project Eligibility
8. Listing of Requested Exceptions / Waivers
9. Filing Fee
10. Development Team
11. Applicant's Prior Development Projects

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

Frederick Casavant IV, Chairman
Pembroke Zoning Board of Appeals
100 Center Street
Pembroke, MA 02359

RE: APPLICATION FOR COMPREHENSIVE PERMIT


Dear Mr. Casavant:

River Marsh LLC, (the "Applicant") hereby submits this application to the Zoning Board of Appeals of the Town of Pembroke, Massachusetts, for the issuance of a Comprehensive Permit authorizing the Applicant to construct a 56 condominium unit, for-sale, housing development to be called River Marsh.

This Application fulfills the submission requirements set forth in Chapter 40B and the Town of Pembroke Board of Appeals Rules and Regulations for Comprehensive Permits (the "Rules and Regulations").

The applicant looks forward to the commencement of the Public Hearing within Thirty (30) Days of the Board's Receipt of this Application.

Sincerely,


Brian P. Murphy,
River Marsh LLC
By its attorney

River Marsh LLC

DEVELOPMENT NARRATIVE

The Developers have created the entity known as River Marsh LLC for the sole purpose of developing River Marsh, a multi-family housing development in accordance with M.G.L 40B, §20-23. This entity shall execute a Regulatory Agreement to be entered into by and between itself, the community, and the lender, thereby creating a "Limited Dividend Organization."

The Town of Pembroke is a suburban community with an affluent and historical residential character. It is bordered by Norwell to the north, Marshfield to the northeast, Duxbury to the east, Kingston to the southeast, Plympton to the south, Halifax to the southwest, Hanson to the west, and Hanover to the northwest. Pembroke is in a convenient location at approximately 12 miles east of Brockton, 13 miles northwest of Plymouth, and 27 miles southeast of Boston.

The total land area of Pembroke is 23.5 square miles with a population of 17,837 at the 2010 Census. According to the Development of Housing and Community Development's 2017 Ch 40B subsidized Housing Inventory, the Town of Pembroke has 6,477 year-round housing units, with 771 units included in its subsidized Housing Inventory for a total of 9.5% of its housing stock.

Existing Site Conditions are shown on the Assessor's map E-15-17A and map E15-17. The site is located between the North River to the west and Water Street, at the intersection of Church Street (Route 139) to the east in Pembroke, Massachusetts.

Virtually the entire site is located within the Residence A zoning district and approximately 10,700 feet are in the Business "B" Zoning District. The site is comprised of approximately 49.94 acres where 27 acres of which are wetlands occupying the western portion of the parcel. No improvements have been made to the land. The undeveloped area is partially wooded and partially cleared with grass cover. The topography of the site is varied with elevation range from 30' along the eastern boundary of the parcel of 5' mean sea level (MSL) at the natural riverbank of the North River. The soil types as identified by the USDA Natural Resources Conservation Service (NRCS) for Plymouth County are classified as Scarboro, Ipswich, Squamscott, Eldridge, Hinckley, Merrimac, Windsor and Deerfield soils. The soils range in hydrological soil group classifications from 'A' to 'D'.

Water Street is a two-lane town owned roadway with a 45' Right of Way along the frontage of the site. The Town of Pembroke Magoun Cemetery is on Water Street across from the proposed entrance to the property. The entrance to the site is approximately 300' from the intersection of Water Street and Route 139. From the intersection of Water Street and Route 139, one can travel along Route 139 from less than 1 mile to Exit 12, Route 3 in Pembroke. The Norwell town line is

immediately north of the site, Marshfield is approximately 1 mile to the east and Duxbury is approximately 2 miles to the southeast.

Affordability Component

We are proposing that twenty five (25%) percent, or 14 units, will be identified as affordable units and will blend with the proposed market rate homes and will be evenly distributed throughout the development. The affordable homes will be marketed to households whose income does not exceed eighty (80%) percent of the area median income, as defined by the Department of Housing and Urban Development.

The sale price for the affordable homes shall be calculated assuming a down payment of five (5%) percent of the approved sales price with a total payment for principal, interest, mortgage insurance premiums, property taxes, property insurance and condominium association fees, if any, not exceed thirty (30%) percent, of a household whose income is seventy (70%) percent of the area median income. Using the above formula and based on the more recent median income as published by HUD, the sales price for the affordable units will be approximately \$180,000.

It is intended that the residents of Pembroke will receive a preference for up to seventy (70%) percent of the affordable units (70% of 14 units is 10). Preference can be determined, regulated and coordinated by the Developer, monitoring agent and the community to include existing local residents, siblings, parents, and offspring of local residents, in addition to municipal workers.

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: PRELIMINARY SITE DEVELOPMENT PLANS

In Accordance with the Town of Pembroke Rules, the following preliminary plans and drawings are provided (the "Comprehensive Permit Preliminary Site Plan") and such plans are incorporated into and made a part of this application:

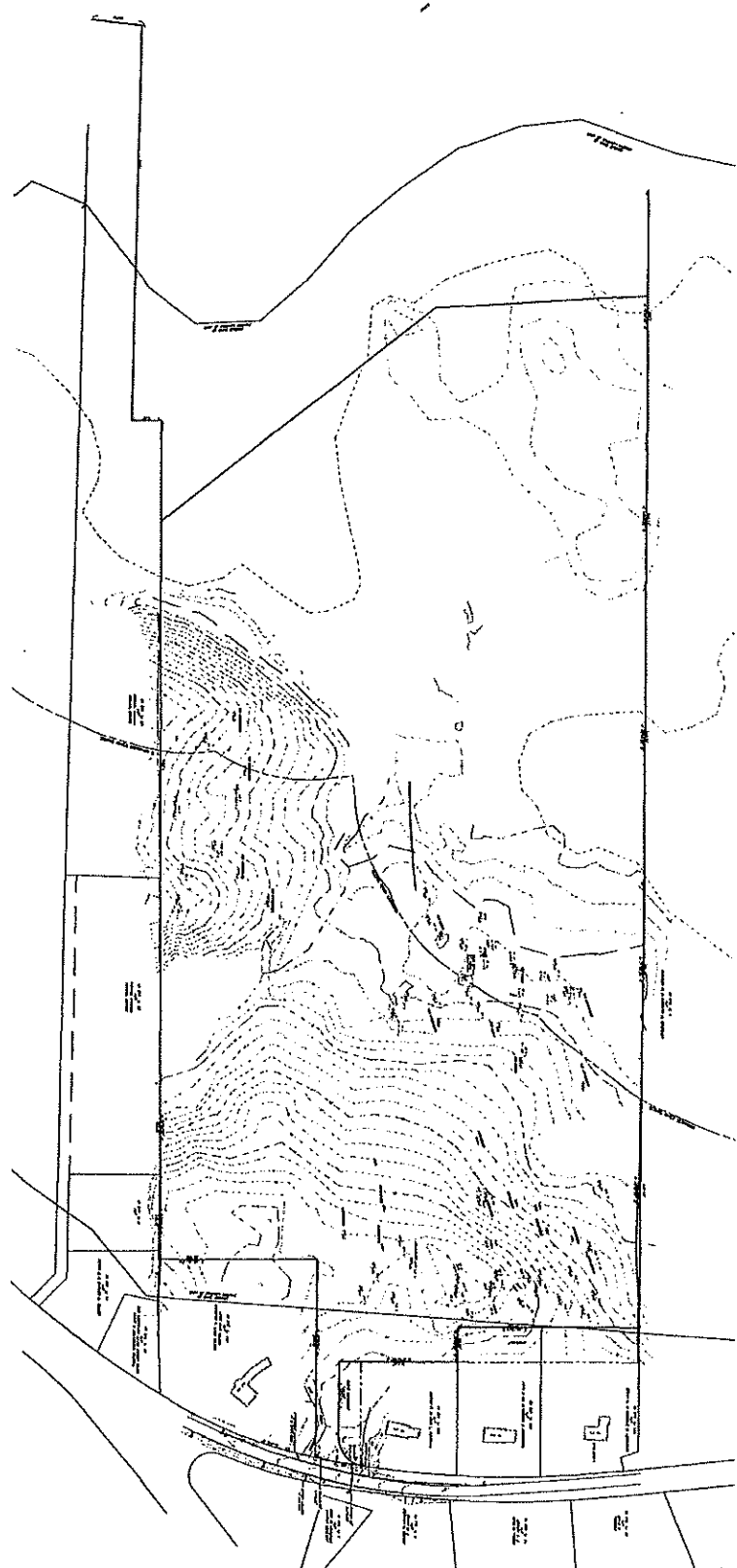
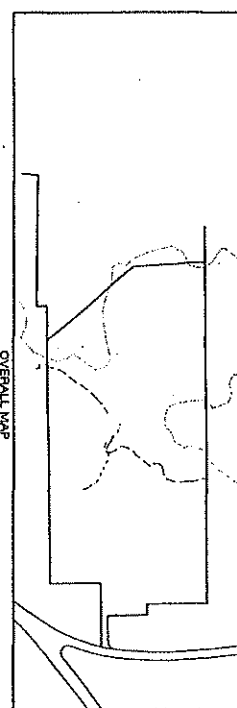
- Narrative Project Description
- Existing Conditions Plan, EX-1
- Preliminary Site Layout Plan, C-1
- Preliminary Grading & Drainage Plan, C-2
- Preliminary Utility Plan, C-3
- Construction Details Sheet 1 of 4, C-4
- Construction Details Sheet 2 of 4, C-5
- Construction Details Sheet 3 of 4, C-6
- Construction Details Sheet 4 of 4, C-7

Proposed Project

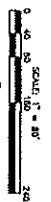
The proposed development will consist of 56 non-age restricted condominium units comprised of 3, 4 and 5 unit buildings with bituminous concrete access driveways and associated infrastructure. Visitor and guest parking will be dispersed throughout the site. Access to the site will be provided by a private 18 ft wide roadway entering from Water Street.

The condominiums have been designed by Axiom Architects and range in square footage from 1,900 to 2,200 square feet. We believe that the buildings will blend with the neighborhood and the town of Pembroke as a whole.

The project will access the utility infrastructure located on Water Street, including water, electric, telephone, gas and cable television. A wastewater collection system will be constructed to convey sewerage flows to an on-site wastewater treatment system. The storm water management system will be designed to fully comply with all the standards of the Department of Environmental Protection's Stormwater Management Policy.



NOTES:
LISTING CONDITIONS INFORMATION OBTAINED FROM AN ON-THE-GROUND SURVEY CONDUCTED BY LAND PLANNING, INC. IN MAY OF 2002.



4) WILCO'S PRODUCTS/15-181 LONGS/CUT SHEETS/181
AFRICA - 15-181-140 OF 15-181-140

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**EXISTING
CONDITIONS
PLAN**

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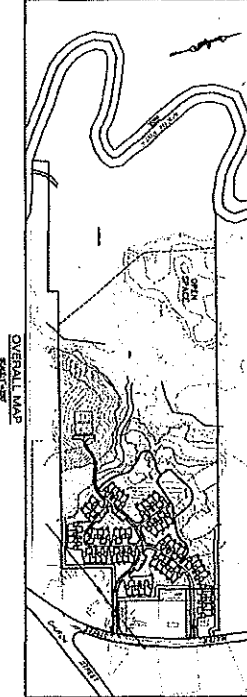
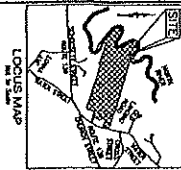
APPLICANT:
River Marsh, LLC
293R Washington Street
Norwell, Massachusetts 02061

PERMIT PLAN SET

RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN

WATER STREET
PEMBROKE, MASSACHUSETTS

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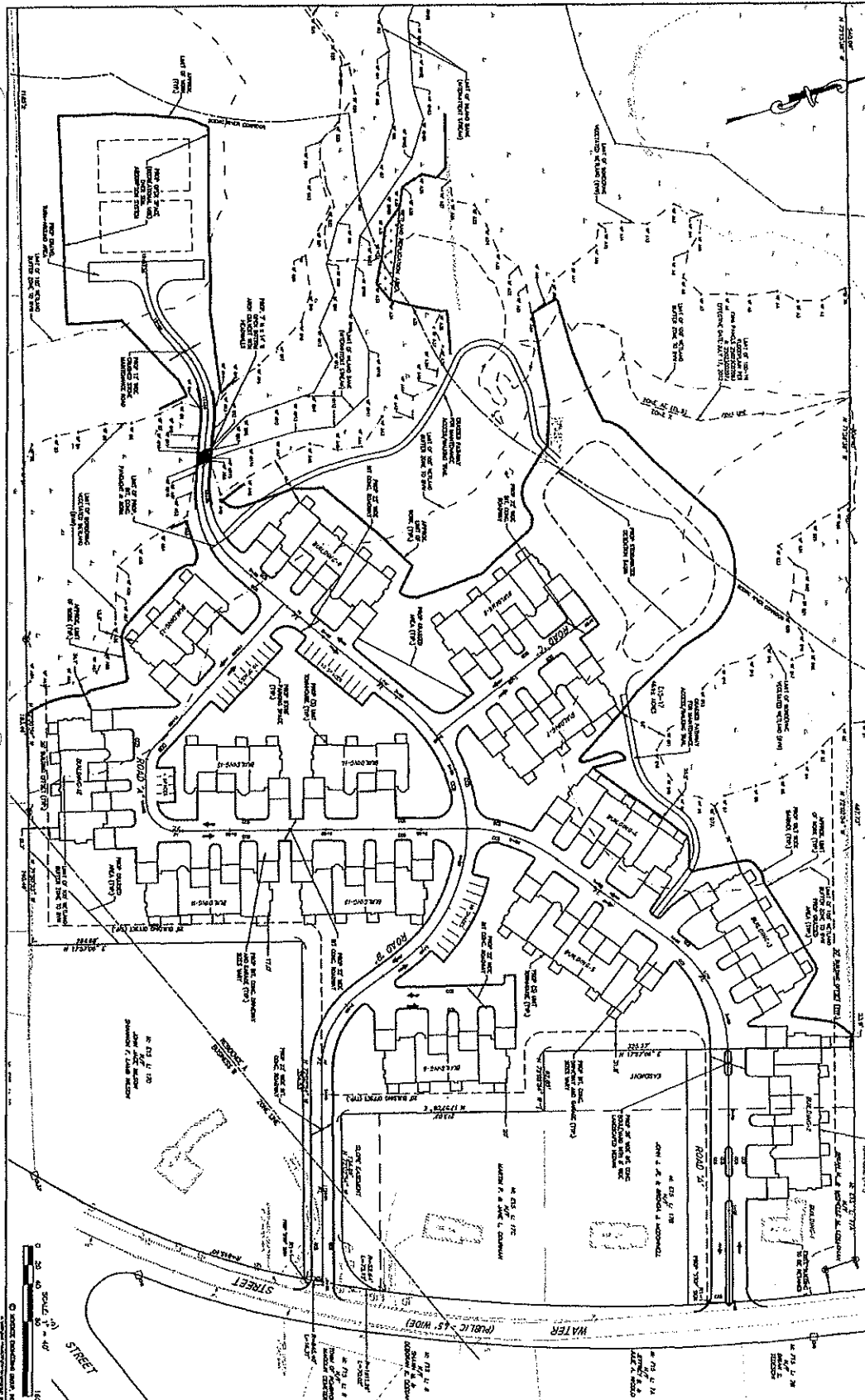
APPROPRIATE AGENCIES
 TOWN OF PEMBROKE
 DEPT. OF PUBLIC WORKS
 DEPT. OF ZONING
 DEPT. OF HEALTH
 DEPT. OF FIRE
 DEPT. OF POLICE
 DEPT. OF PLANNING
 DEPT. OF ENVIRONMENTAL AFFAIRS
 DEPT. OF SOCIAL SERVICES
 DEPT. OF EDUCATION
 DEPT. OF RECREATION
 DEPT. OF TRANSPORTATION
 DEPT. OF UTILITIES
 DEPT. OF LAND USE
 DEPT. OF CONSERVATION
 DEPT. OF HISTORIC PRESERVATION
 DEPT. OF COMMUNITY DEVELOPMENT
 DEPT. OF ECONOMIC DEVELOPMENT
 DEPT. OF INFRASTRUCTURE
 DEPT. OF LEGAL AFFAIRS
 DEPT. OF RECORDS & COMMUNICATIONS
 DEPT. OF TECHNOLOGY
 DEPT. OF TREASURY
 DEPT. OF VETERANS AFFAIRS
 DEPT. OF WORKERS COMPENSATION
 DEPT. OF YOUTH SERVICES

PERMIT PLAN SET
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 (3) 3-UNIT BUILDING
 (4) 4-UNIT BUILDING
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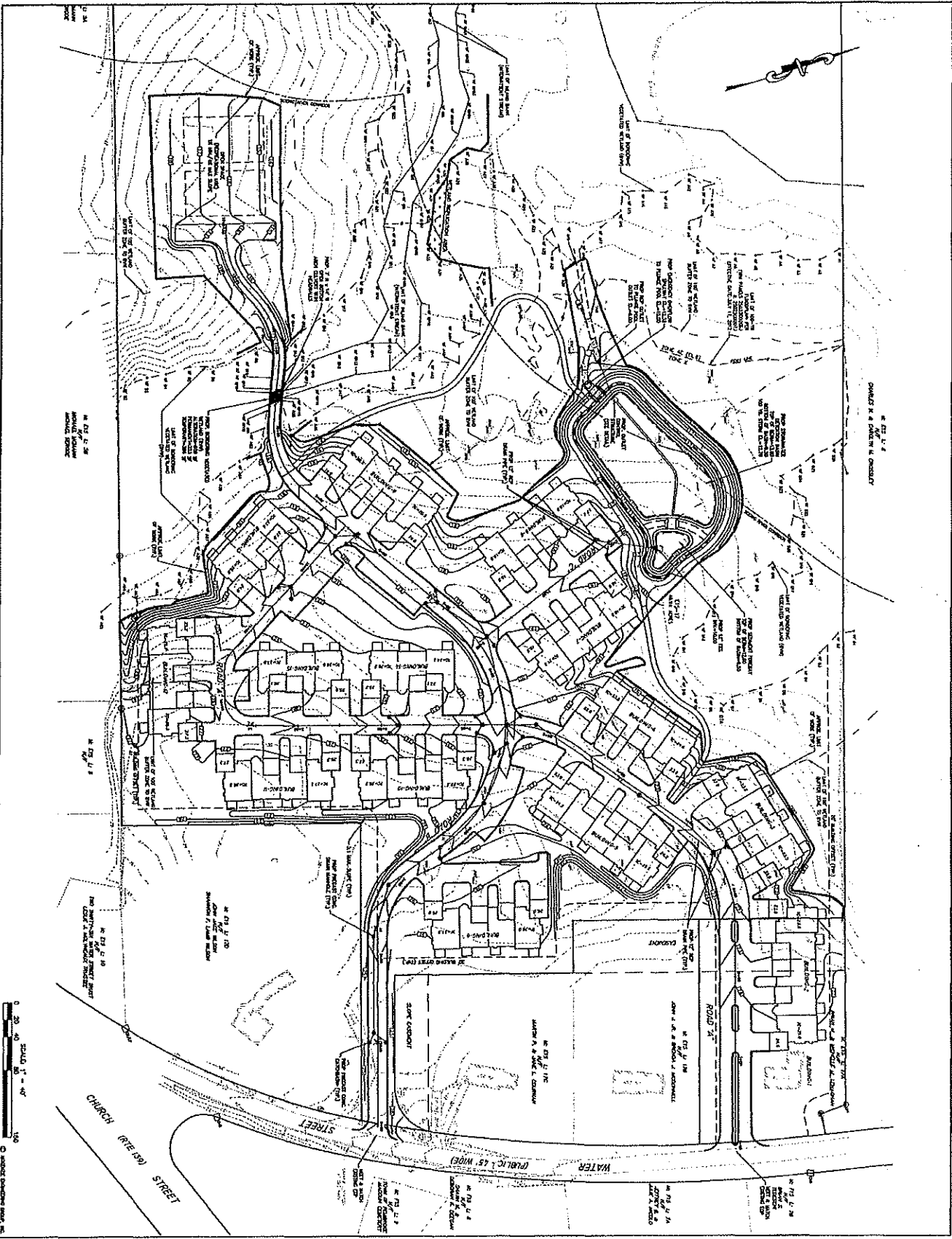
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 ROAD A - 1,257' L
 ROAD B - 500' L
 ROAD C - 3,427' L
 TOTAL LENGTH OF ROADS - 5,184' L

SOILS
 SOIL A - 1,257' L
 SOIL B - 500' L
 SOIL C - 3,427' L
 TOTAL LENGTH OF SOILS - 5,184' L

WATER
 WATER A - 1,257' L
 WATER B - 500' L
 WATER C - 3,427' L
 TOTAL LENGTH OF WATER - 5,184' L



OWNER/APPLICANT: RIVER MARSH, LLC 2010 WASHINGTON STREET NORFOLK, MASSACHUSETTS 01901		PERMIT PLAN SET	
PROJECT NAME: RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN (ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274) WATER STREET PEMBROKE, MASSACHUSETTS		DATE: 10/1/2010	
SCALE: 1" = 20'		PROJECT NO.: C-1	



OVERSIGHT:

RIVER MARSH, LLC
2901 WASHINGTON STREET
KORVILL, MASSACHUSETTS 02041

PERMIT PLAN SET

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**

(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)

WATER STREET

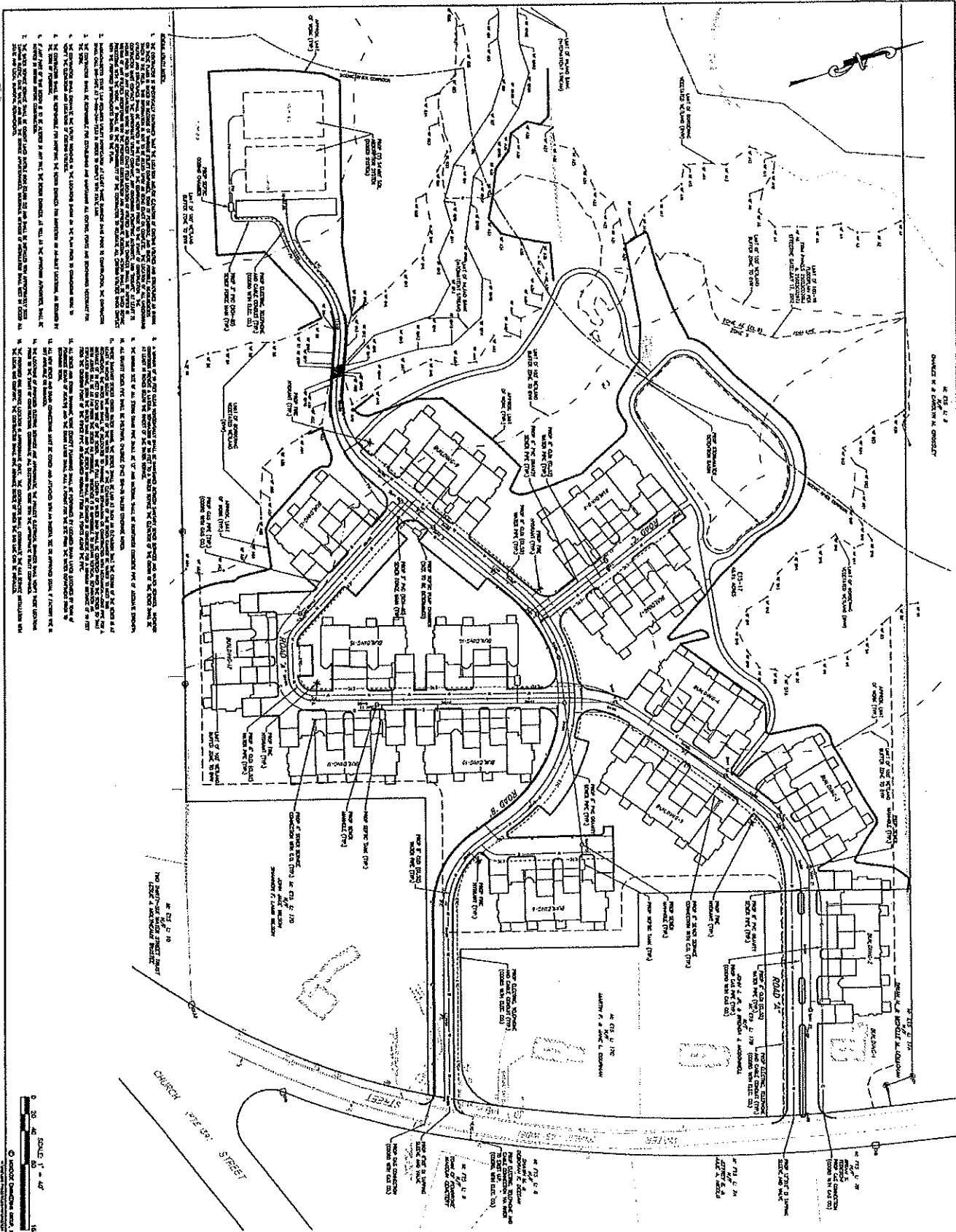
PEMBROKE, MASSACHUSETTS

REVISIONS

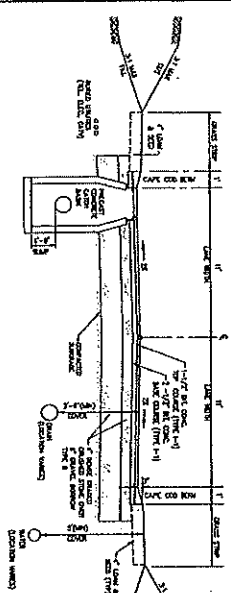
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3	1/17/2007	ISSUED FOR WASHINGTON STREET

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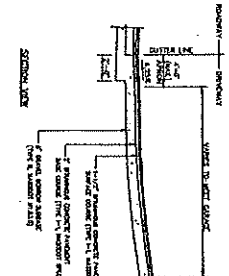
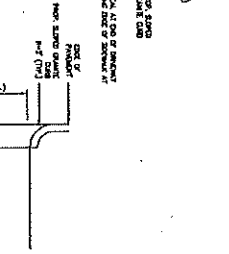
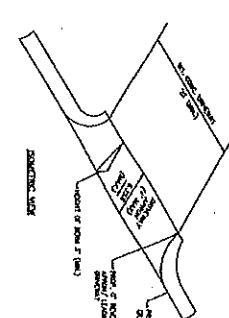
1000 WASHINGTON STREET
PEMBROKE, MASSACHUSETTS 02041



RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN (ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274) WATER STREET PEMBROKE, MASSACHUSETTS		11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
CHERRYAPPLICANT: RIVER MARSH, LLC 2000 WASHINGTON STREET NORWELL, MASSACHUSETTS 02061		101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
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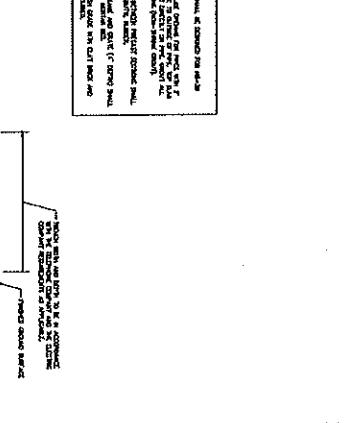
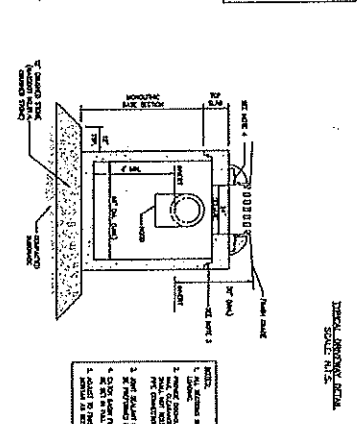
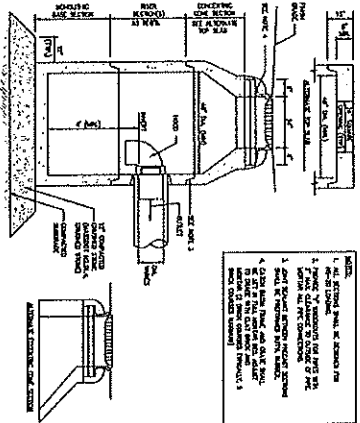


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SCALE: 1/8" = 1'-0"

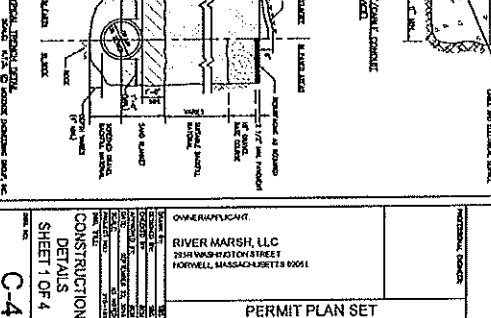
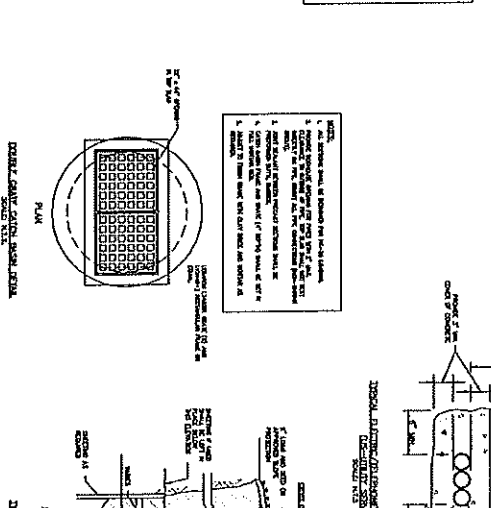
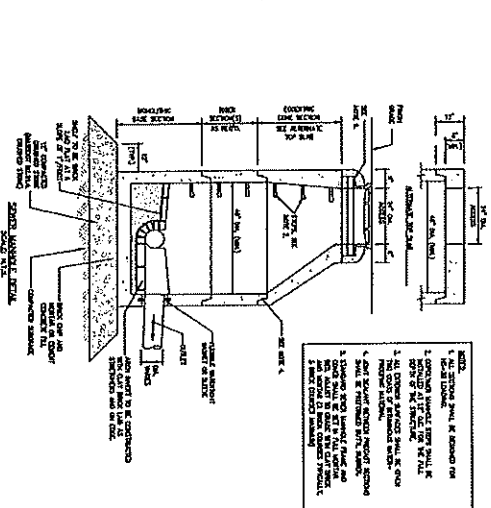
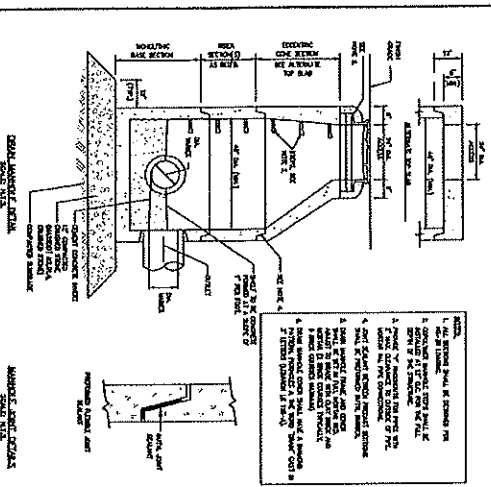


NO.	DESCRIPTION	DATE	BY	CHECKED
1	PREPARED BY: [Name]			
2	DESIGNED BY: [Name]			
3	CHECKED BY: [Name]			
4	APPROVED BY: [Name]			

- GENERAL NOTES:**
1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE MASSACHUSETTS DEPARTMENT OF CONSTRUCTION (MDC) SPECIFICATIONS FOR CONSTRUCTION OF BUILDINGS.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 3. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE CITY ENGINEER.
 4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES AND STRUCTURES.
 6. THE CONTRACTOR SHALL MAINTAIN ADEQUATE RECORDS OF ALL CONSTRUCTION ACTIVITIES.
 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY INSURANCE COVERAGE.
 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY LABORER'S COMPENSATION CERTIFICATES.
 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY ENVIRONMENTAL IMPACT STATEMENTS.
 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY HISTORIC PRESERVATION CERTIFICATES.



NO.	DESCRIPTION	DATE	BY	CHECKED
1	PREPARED BY: [Name]			
2	DESIGNED BY: [Name]			
3	CHECKED BY: [Name]			
4	APPROVED BY: [Name]			



NO.	DESCRIPTION	DATE	BY	CHECKED
1	PREPARED BY: [Name]			
2	DESIGNED BY: [Name]			
3	CHECKED BY: [Name]			
4	APPROVED BY: [Name]			

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

PERMIT PLAN SET
RIVER MARSH, LLC
255 WASHINGTON STREET
NORWELL, MASSACHUSETTS 02061

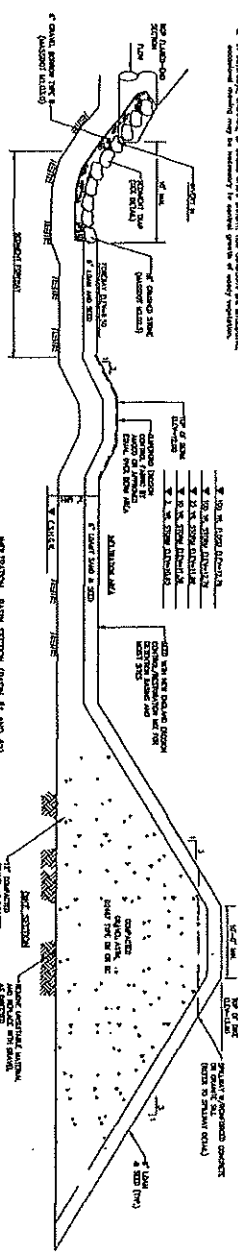
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2	DESIGNED BY: [Name]			
3	CHECKED BY: [Name]			
4	APPROVED BY: [Name]			

SECTION 1: GENERAL NOTES

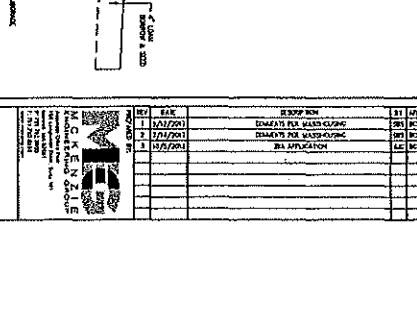
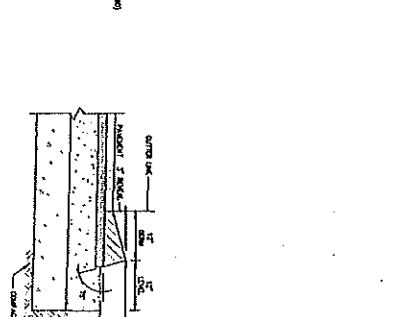
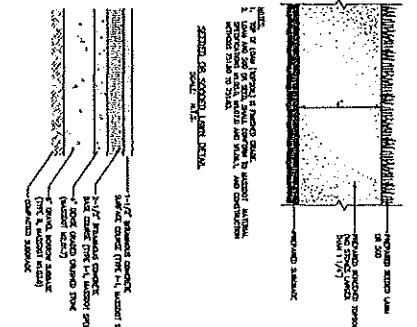
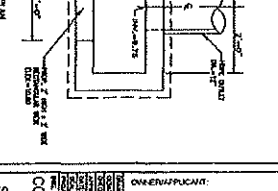
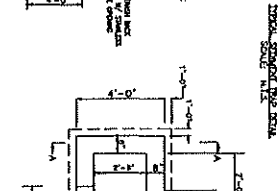
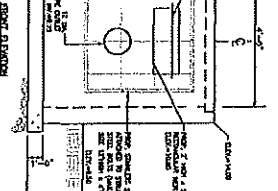
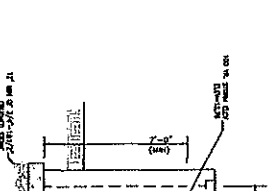
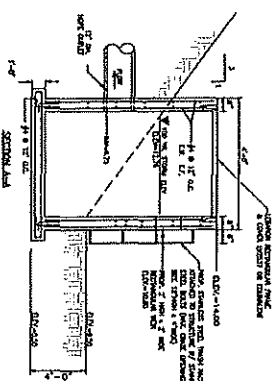
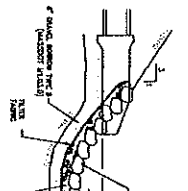
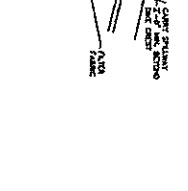
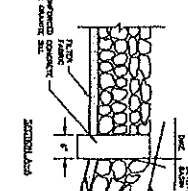
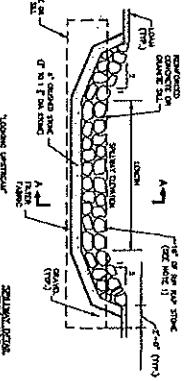
1. GENERAL NOTES

1. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
2. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
3. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
4. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
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9. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
10. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.

SECTION 2: MATERIALS	SECTION 3: CONSTRUCTION	SECTION 4: FINISHES
<p>2.1. GENERAL</p> <p>All materials shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>2.2. STEEL</p> <p>Steel shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC).</p> <p>2.3. CONCRETE</p> <p>Concrete shall be of the highest quality and shall conform to the specifications of the American Concrete Institute (ACI).</p>	<p>3.1. GENERAL</p> <p>All construction shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>3.2. FOUNDATION</p> <p>Foundation shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>3.3. WALLS</p> <p>Walls shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>3.4. ROOF</p> <p>Roof shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p>	<p>4.1. GENERAL</p> <p>All finishes shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>4.2. PAINT</p> <p>Paint shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>4.3. PLASTER</p> <p>Plaster shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>4.4. TILE</p> <p>Tile shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p>



SECTION 5: DETAILS
<p>5.1. GENERAL</p> <p>All details shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>5.2. FOUNDATION</p> <p>Foundation details shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>5.3. WALLS</p> <p>Wall details shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p> <p>5.4. ROOF</p> <p>Roof details shall be of the highest quality and shall conform to the specifications of the American Institute of Steel Construction, Inc. (AISC) and the American Concrete Institute (ACI).</p>



1. The Contractor shall be responsible for obtaining all necessary permits from the appropriate local, state, and federal agencies.
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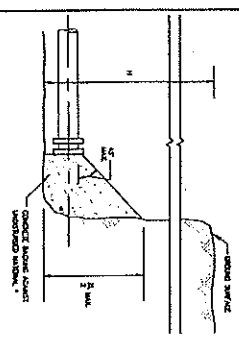
RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN
 (ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
 WATER STREET
 PEMBROKE, MASSACHUSETTS

PERMIT PLAN SET

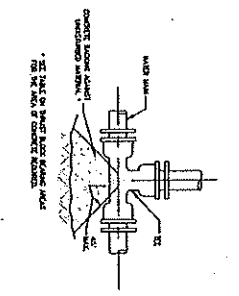
CONSTRUCTION

SHEET 2 OF 4

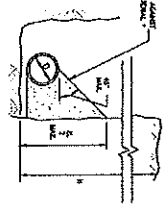
C-5



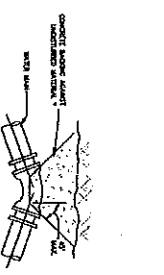
STANDARD WATER METER INSTALLATION



WATER METER WITH BYPASS VALVE



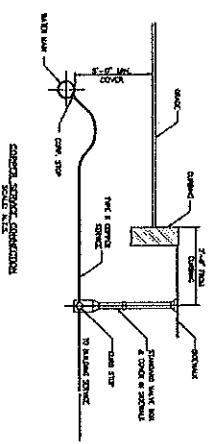
WATER METER WITH CHECK VALVE



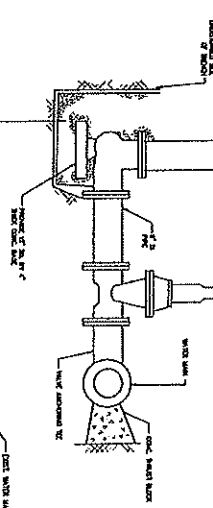
WATER METER WITH BYPASS VALVE AND CHECK VALVE

WATER METER	WATER METER	WATER METER	WATER METER
1"	1 1/2"	2"	2 1/2"
3"	4"	6"	8"
10"	12"	16"	20"
24"	30"	36"	48"

WATER METER INSTALLATION NOTES:
 1. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
 2. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
 3. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
 4. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
 5. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.



WATER METER WITH BYPASS VALVE AND CHECK VALVE



WATER METER WITH BYPASS VALVE AND CHECK VALVE

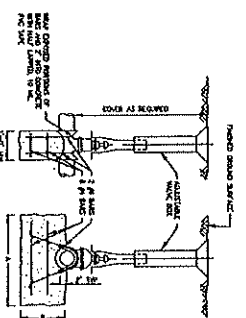
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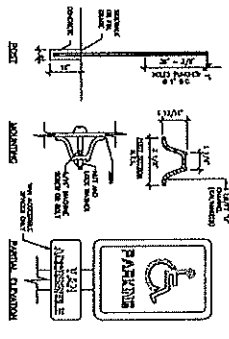
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12. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
13. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
14. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.
15. WATER METER SHALL BE INSTALLED IN A CONCRETE PAD.

SIZE OF METER	SIZE OF VALVE	SIZE OF PIPING	SIZE OF PIPING
1"	1"	1"	1"
1 1/2"	1 1/2"	1 1/2"	1 1/2"
2"	2"	2"	2"
2 1/2"	2 1/2"	2 1/2"	2 1/2"
3"	3"	3"	3"
4"	4"	4"	4"
6"	6"	6"	6"
8"	8"	8"	8"
10"	10"	10"	10"
12"	12"	12"	12"
16"	16"	16"	16"
20"	20"	20"	20"
24"	24"	24"	24"
30"	30"	30"	30"
36"	36"	36"	36"
48"	48"	48"	48"

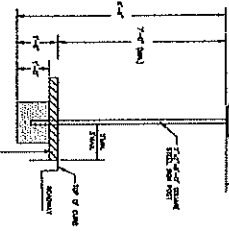
WATER METER INSTALLATION NOTES:
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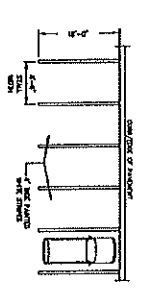
WATER METER WITH BYPASS VALVE AND CHECK VALVE



WATER METER WITH BYPASS VALVE AND CHECK VALVE



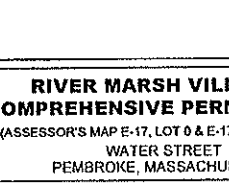
WATER METER WITH BYPASS VALVE AND CHECK VALVE



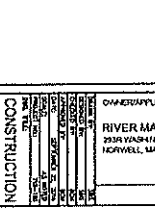
WATER METER WITH BYPASS VALVE AND CHECK VALVE

SIZE OF METER	SIZE OF VALVE	SIZE OF PIPING	SIZE OF PIPING
1"	1"	1"	1"
1 1/2"	1 1/2"	1 1/2"	1 1/2"
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2 1/2"	2 1/2"	2 1/2"	2 1/2"
3"	3"	3"	3"
4"	4"	4"	4"
6"	6"	6"	6"
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10"	10"	10"	10"
12"	12"	12"	12"
16"	16"	16"	16"
20"	20"	20"	20"
24"	24"	24"	24"
30"	30"	30"	30"
36"	36"	36"	36"
48"	48"	48"	48"

WATER METER WITH BYPASS VALVE AND CHECK VALVE



WATER METER WITH BYPASS VALVE AND CHECK VALVE



WATER METER WITH BYPASS VALVE AND CHECK VALVE

RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN
 (ASSESSOR'S MAP E-17, LOT 6 & E-17A, LOT 274)
 WATER STREET
 PEMBROKE, MASSACHUSETTS

OWNER: RIVER MARSH, LLC
 200 RIVER MARSH DRIVE
 PEMBROKE, MASSACHUSETTS 01968

DESIGNER: C. M. N. ENGINEERING, INC.
 100 RIVER MARSH DRIVE
 PEMBROKE, MASSACHUSETTS 01968

DATE: 10/1/2011

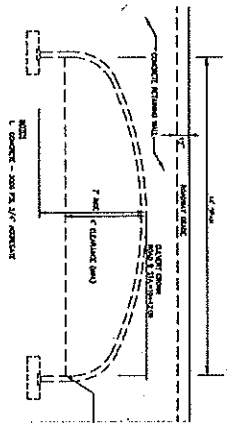
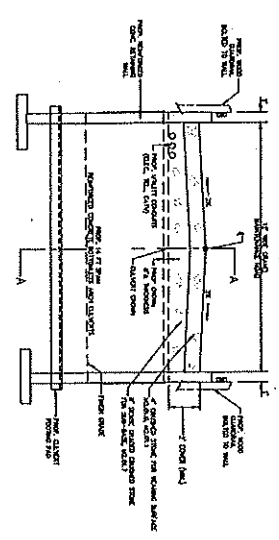
SHEET 3 OF 4

REVISIONS:

NO.	DATE	DESCRIPTION
1	10/1/2011	ISSUED FOR PERMIT

APPROVED BY: [Signature]

DATE: 10/1/2011



RECTANGULAR CONCRETE JACKET
SHOULD BE USED

RECTANGULAR CONCRETE JACKET
SHOULD BE USED



TYPICAL RECTANGULAR CONCRETE JACKET
SHOULD BE USED

DATE	BY	FOR	REVISION
1/1/2017	1	1	1
1/1/2017	2	2	2
1/1/2017	3	3	3
1/1/2017	4	4	4
1/1/2017	5	5	5
1/1/2017	6	6	6
1/1/2017	7	7	7
1/1/2017	8	8	8
1/1/2017	9	9	9
1/1/2017	10	10	10

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GENERAL NOTES

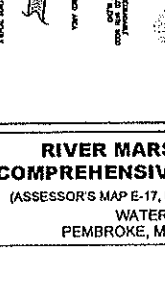
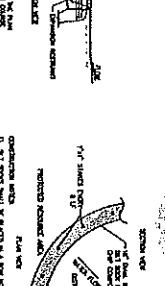
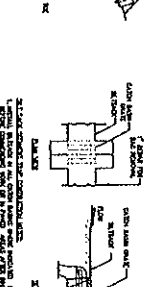
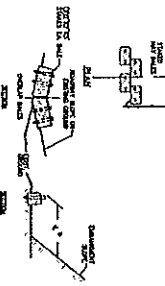
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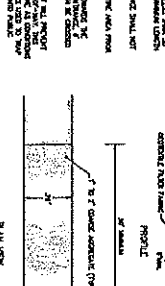
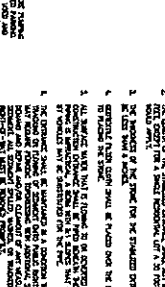
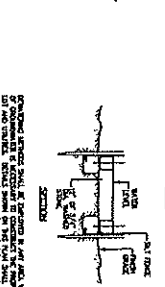
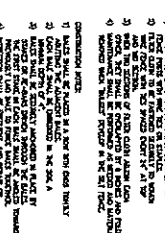
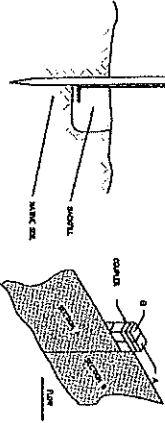
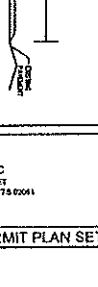
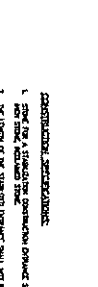
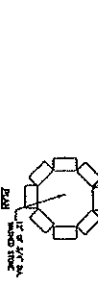
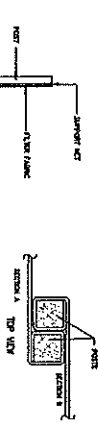


TYPICAL RECTANGULAR CONCRETE JACKET
SHOULD BE USED

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SHOULD BE USED

RECTANGULAR CONCRETE JACKET
SHOULD BE USED

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

CONSTRUCTION
SHEET 4 OF 4

OWNER/APPPLICANT:
RIVER MARSH, LLC
200 WASHINGTON STREET
PEMBROKE, MASSACHUSETTS 02658

PERMIT PLAN SET

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: REPORT ON EXISTING CONDITIONS

In accordance with the Town of Pembroke Rules, the existing conditions at the site are documented in the Comprehensive Permit Plan Set at Tab 2, including the Existing Conditions Plans EX-1 and the Preliminary Grading and Drainage Plan C-2, the Drainage Calculations and Stormwater Management Plan dated September 7, 2018 referenced at Tab 4 and submitted electronically, and in the report attached hereto.

River Marsh Village Development, Pembroke, MA (Assessor's Map E-17 Lot 0 & E-17A Lot 274)

EXISTING CONDITIONS

The River Marsh Village site consists of approximately 49.94 acres of land located between the North River to the west and Water Street, at the intersection of Church Street (Route 139) to the east in Pembroke, Massachusetts. Virtually the entire site is within the Residence "A" Zoning District. Access to the site is from the east off Water Street and through the Business "B" Zoning District. Approximately 10,700 +/- square feet are in the Business "B" Zoning District. Within less than one mile east of the property, is an Industrial Zone 'B' developed area, which abuts Pilgrims Highway (Massachusetts State Route 3). Homes within the immediate area are generally colonial-style, wooded-framed structures.

The parcel is partially wooded and partially cleared with grass cover and wetlands toward the west side of the site approaching the North River. No improvements have been made to the land. The topography of the site is varied with elevations range from 30' along the eastern boundary of the parcel of 5' mean sea level (MSL) at the natural riverbank of the North River. Slopes vary from gentle to somewhat steeper grades sloping toward the wetlands on the west side of the site. The soil types as identified by the USDA Natural Resources Conservation Service (NRCS) for Plymouth County are classified as Scarboro, Ipswich, Squamscott, Eldridge, Hinckley, Merrimac, Windsor and Deerfield soils. The soils range in hydrological soil group classifications from 'A' to 'D'. In addition to the NRCS information, subsurface exploration has been conducted by R.H. Cole & Associate in July of 1992 and September of 1993. The deep observation holes revealed primarily fine to coarse sand (HSG A) throughout the upland areas of the site.

Wetlands occupy approximately 27 acres along the western portion of the parcel. The Pembroke Conservation Commission has confirmed the wetland resource area by issuance of an Order of Resource Area Delineation dated June 3, 2003 for DEP File #SE 56-732. The site is located within Zone AE and Zone X of the Flood Insurance Rate Map, as shown on the current FEMA Flood Insurance Rate Map Panel Nos. 25023C0206J and 25023C0207J with an effective date of July 17, 2012.

Runoff from the site generally flows in two (2) directions: to the northwest towards a low area on the site and west toward the River. There is an 8" CI water main in Water Street at the entrance to the site. Soils on the upland portions of the parcel consist primarily of sand with pockets of silt and gravel.

Water Street is a two-lane town owned roadway with a 45' Right of Way along the frontage of the site. The Town of Pembroke Magoun Cemetery is on Water Street across from the proposed entrance to the property. The entrance to the site is approximately 300' from the intersection of Water Street and Route 139. From the intersection of Water Street and Route 139 one can travel along Route 139 for less than 1 mile to Exit 12, Route 3 in Pembroke. The Norwell town line is immediately north of the site, Marshfield is approximately 1 mile to the east and Duxbury is approximately 2 miles to the southeast.

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: DRAINAGE CALCULATIONS

In accordance with the Town of Pembroke Rules, Drainage Calculations and Stormwater Management Plan dated September 7, 2018 are provided electronically due to size of the plan, and such plan is incorporated into and made part of this application.

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: PRELIMINARY SCALED ARCHITECTURAL DRAWINGS

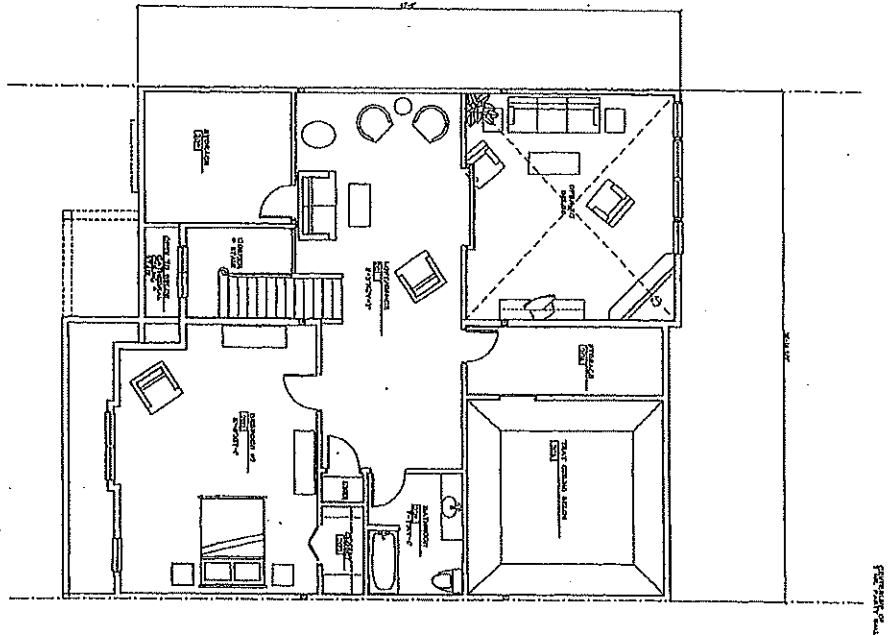
In accordance with the Town of Pembroke Rules, preliminary scaled architectural drawings for each building including typical floor plans, typical elevations and sections, and identifying construction type and typical materials specifications and exterior finish are provided (the "Comprehensive Permit Preliminary Architectural Plan"), and such plans are incorporated into and made part of this application:

Architectural Description

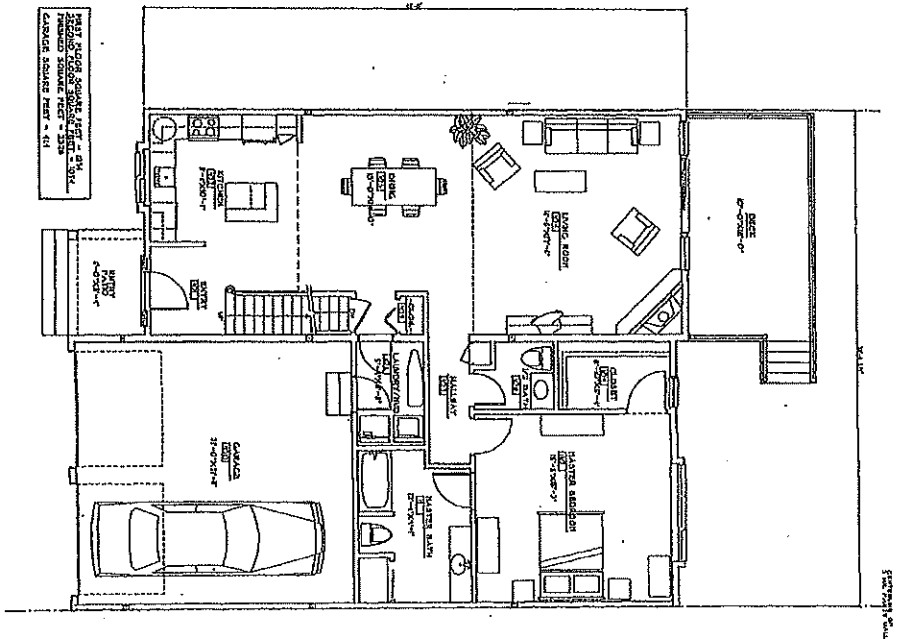
The proposed buildings are designed with pitched roofs that are no more than two stories high. However, the buildings are scaled down to emulate a similar massing to the single-family homes in the surrounding neighborhood, which are all one and two story wood framed buildings. This is accomplished by presenting varying single story rooflines across the entire front and rear of each building.

On the front there is a one story porch adjoining a projecting single story pitched garage roof. The garage is integrated into the front elevation to provide an ease of access while minimizing the need for excessing paved surfaces. The scale of the garage is visually reduced with the layering of roof lines on the front elevation of the homes. The second story front bedroom dormers are each 16' wide with gables facing the street presenting a varied second story roofline.

The rear elevations are one story with second story dormers facing the back of the building. A half-story clerestory window in the first floor family room of each unit breaks up the roof line. The exterior finishes of the buildings are also selected from typical New England residential materials to blend with the surrounding neighborhood. To give the project some variety, the siding may vary slightly in color, orientation, exposure or possibly between painted clapboards and solid-stained wood shingles. The trim will be typical painted wood rakes, casings, fascia, etc. Roofing will be a single color of architectural asphalt shingles typical throughout. Windows will be white, weather resistant double hung fenestrations with 6/6 mounting patterns to blend with the colonial character of Pembroke. Foundations will be concrete but reduced as low as feasible to the grade to minimize visual appearance. Entry porches will be stone or a similar cultured product and exterior columns, decks and railings will be a combination of wood and/or composite materials for increased durability and longevity of appearance.



○ TYPICAL SECOND FLOOR PLAN-(2) BEDROOM MIDDLE UNIT
SCALE 1/4" = 1'-0"



○ TYPICAL FIRST FLOOR PLAN-(2) BEDROOM MIDDLE UNIT
SCALE 1/4" = 1'-0"

ALAN B. BELLAMY, AIA
ARCHITECT
1000 W. 10TH STREET
PENSACOLA, FL 32506
904/487-1111

RIVER MARSH VILLAGE
WATER STREET
PEMBROKE, MA

ARCHITECT

REVISIONS

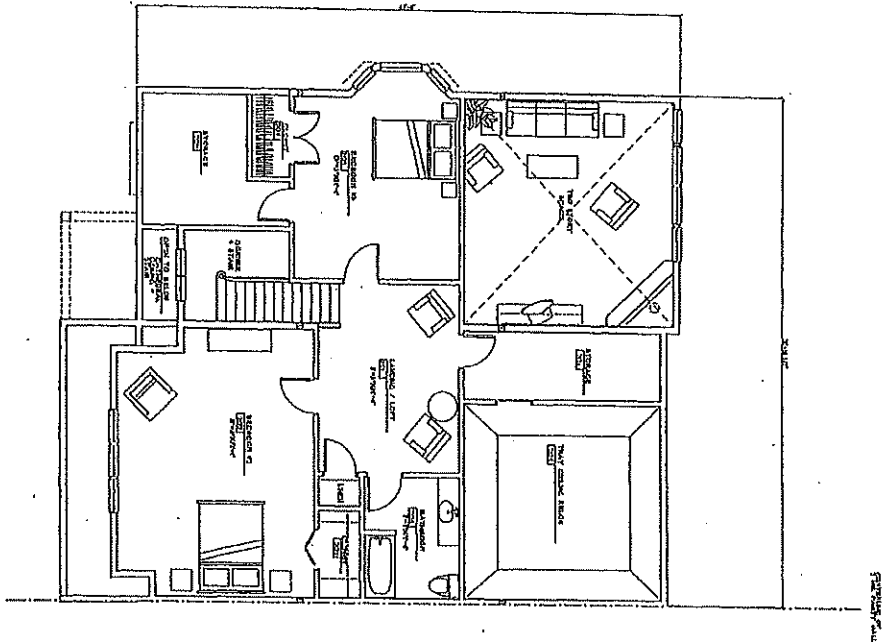
3 BEDROOM
MIDDLE UNIT

QUINCY,
RIVER MARSH
VILLAGE
1000 W. 10TH STREET
ST. NORRELL,
MASSACHUSETTS

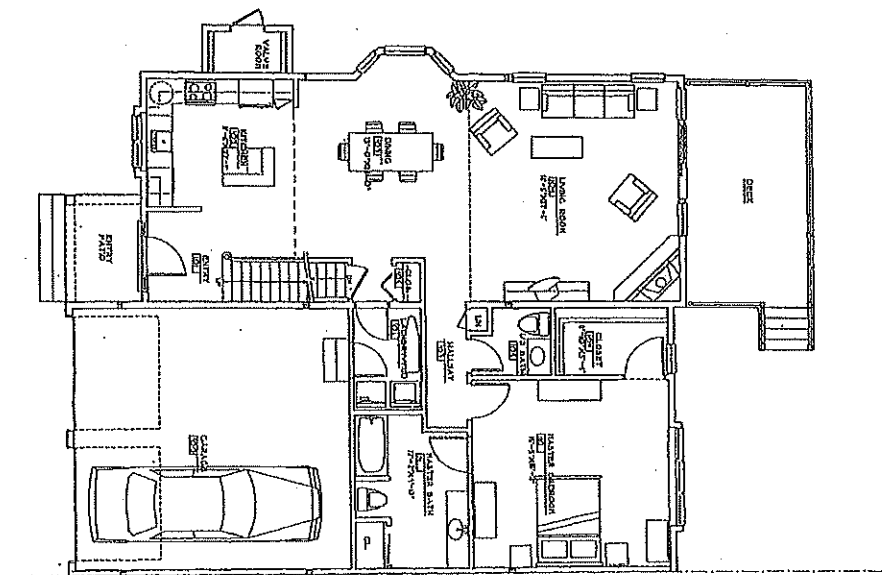
TYPICAL
FLOORPLANS

DATE: 3 DEC. 2004
SCALE: 1/4" = 1'-0"
PLOT: 3/10/05

A1



○ TYPICAL SECOND FLOOR PLAN-(3) BEDROOM END UNIT
SCALE: 1/8" = 1'-0"



○ TYPICAL FIRST FLOOR PLAN-(3) BEDROOM END UNIT
SCALE: 1/8" = 1'-0"

UNIT 301
RIVER MARSH VILLAGE
WATER STREET
PEMBROKE, MA

RIVER MARSH VILLAGE
WATER STREET
PEMBROKE, MA

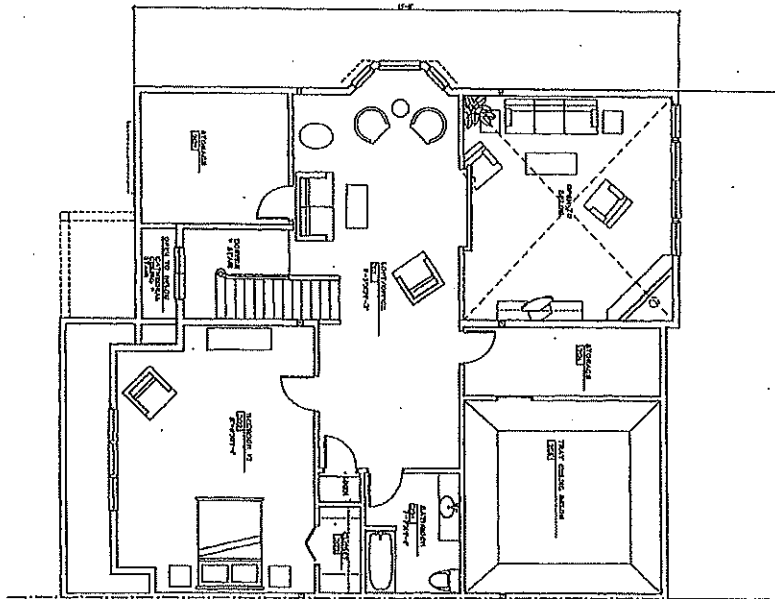
REVISIONS

OWNER:
RIVER MARSH
VILLAGE
WATER STREET
PEMBROKE, MA

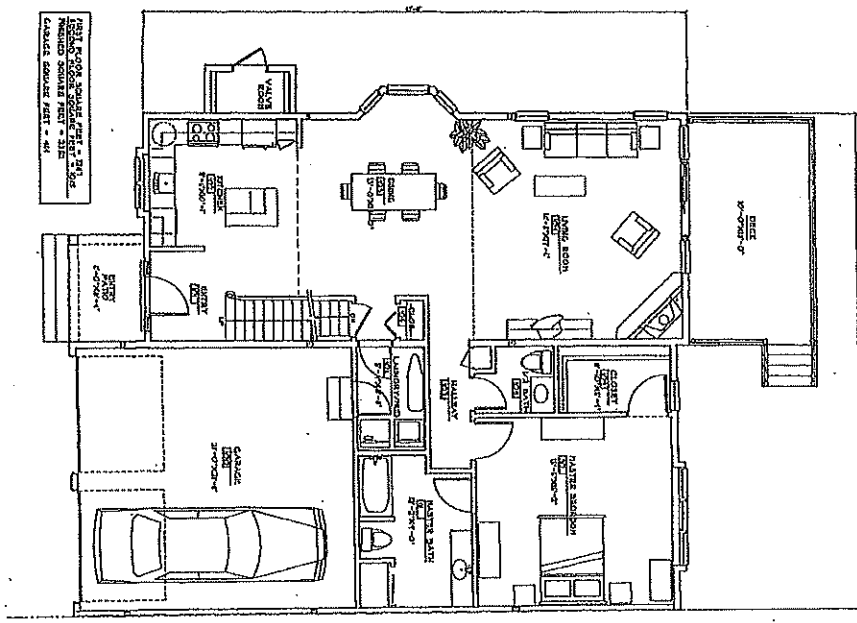
TYPICAL FLOOR PLANS

DATE: 3 DEC 2004
SCALE: 1/8" = 1'-0"
FILE: 301-302

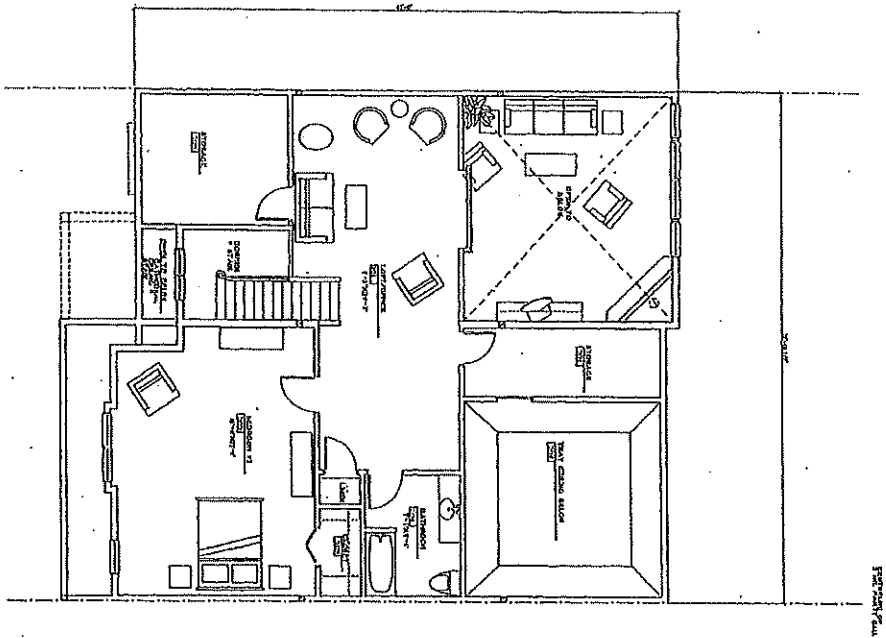
A1



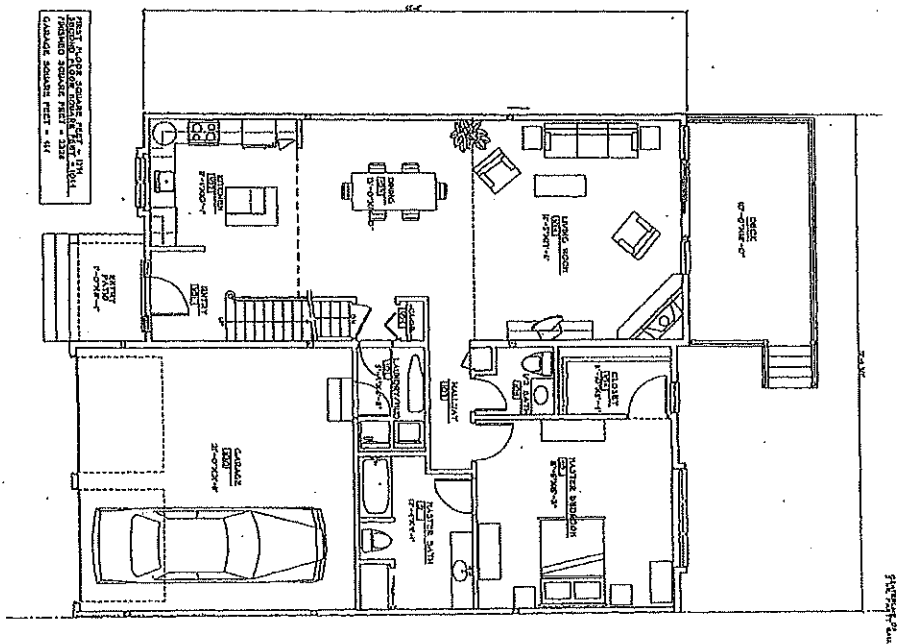
○ TYPICAL SECOND FLOOR PLAN (2) BEDROOM END UNIT
SCALE 1/8" = 1'-0"



○ TYPICAL FIRST FLOOR PLAN (2) BEDROOM END UNIT
SCALE 1/8" = 1'-0"



○ TYPICAL SECOND FLOOR PLAN-(12) BEDROOM MIDDLE UNIT
SCALE: 1/8" = 1'-0"



○ TYPICAL FIRST FLOOR PLAN-(12) BEDROOM MIDDLE UNIT
SCALE: 1/8" = 1'-0"

ALAN B. BROWN, AIA
ARCHITECT
1000 WASHINGTON STREET
PEMBROKE, MA 01969
TEL: 508/833-1111
FAX: 508/833-1112

RIVER MARSH VILLAGE
WATER STREET
PEMBROKE, MA

REVISIONS

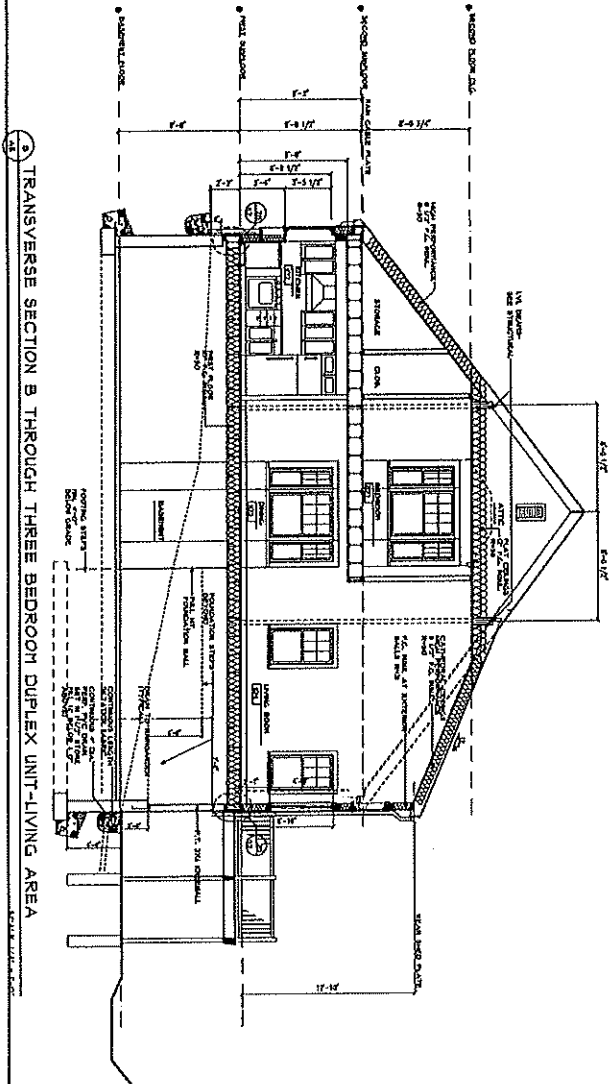
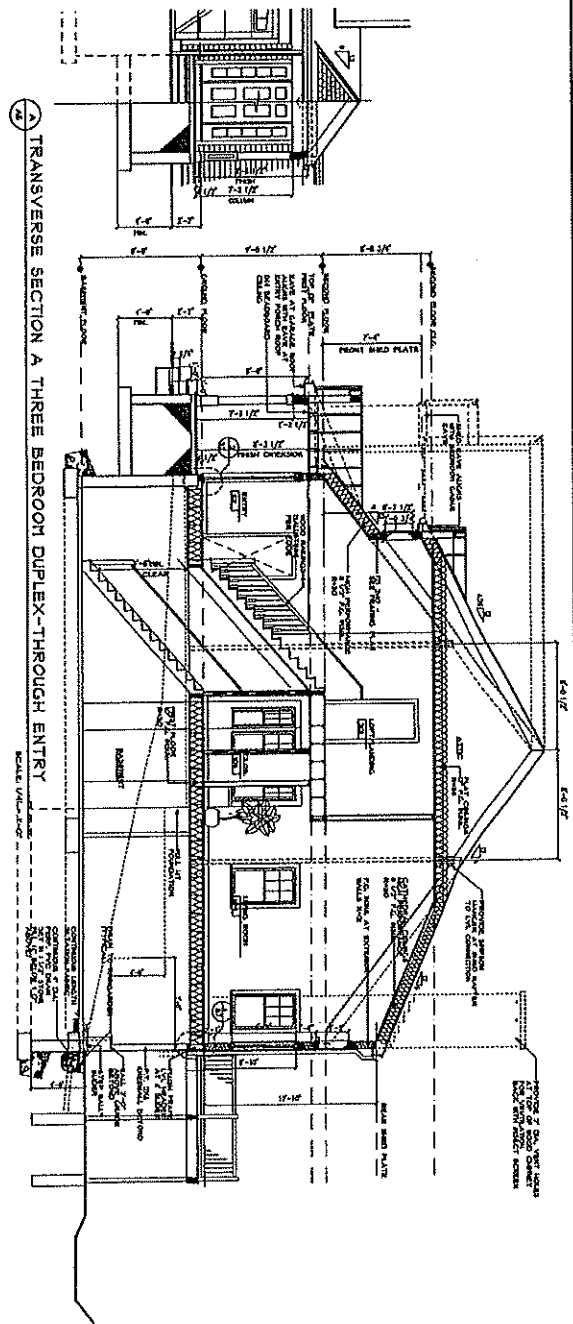
NO.	DATE	DESCRIPTION
1	10/1/98	1 BEDROOM FLOOR PLAN

OWNER:
RIVER MARSH
VILLAGE
1000 WASHINGTON
STREET
PEMBROKE, MA 01969

TYPICAL FLOOR PLANS

DATE: 3 DEC 2006
SCALE: 1/8" = 1'-0"
FILE: RIVER MARSH

A1



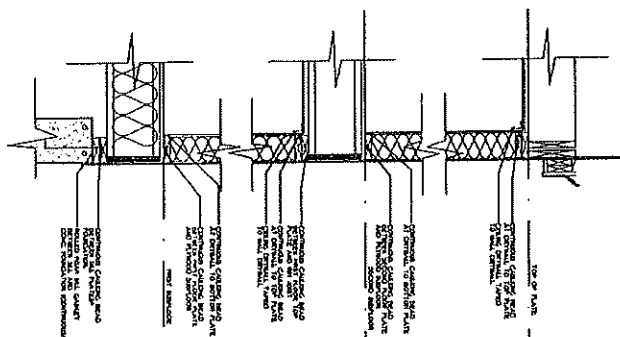
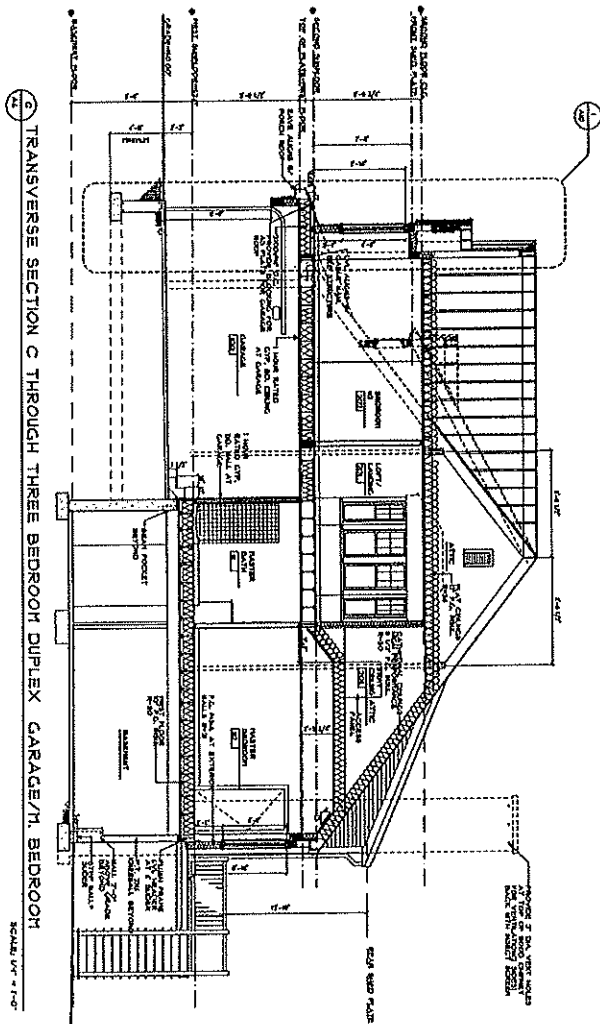
RIVER MARSH CONDOMINIUMS
WATER STREET
PEMBROKE, MASSACHUSETTS

REVISIONS

BUILDING
SECTIONS

DATE: 8 NOV 2006
DRAWN BY: J. J. J.
FILE SECTION

A5

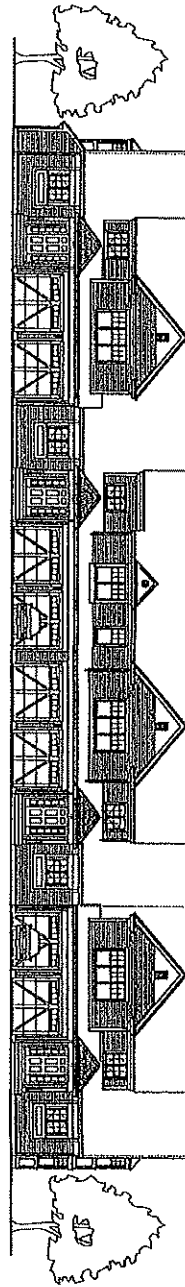


RIVER MARSH CONDOMINIUMS
WATER STREET
PEMBROKE, MASSACHUSETTS

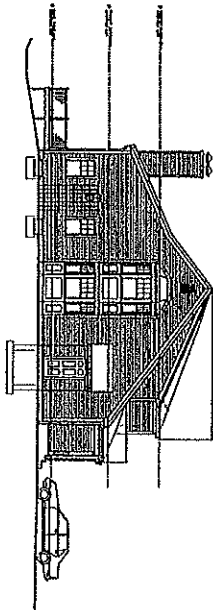
REVISIONS

BUILDING
SECTIONS
DATE: 4/20/2004
SCALE: 1/4\"/>

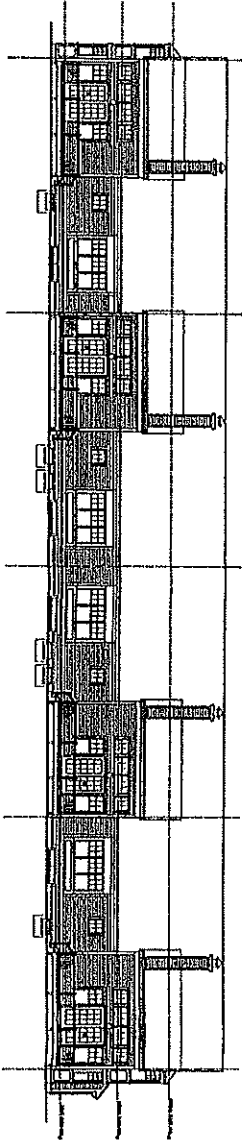
A6



FRONT ELEVATION - TWO FIFTEEN BEDROOM GARDENWAY UNIT



SIDE ELEVATION - TWO FIFTEEN BEDROOM GARDENWAY UNIT



REAR ELEVATION - TWO FIFTEEN BEDROOM GARDENWAY UNIT



RIVER MARSH VILLAGE
WATER STREET
PEMBROKE, MA

REVISIONS

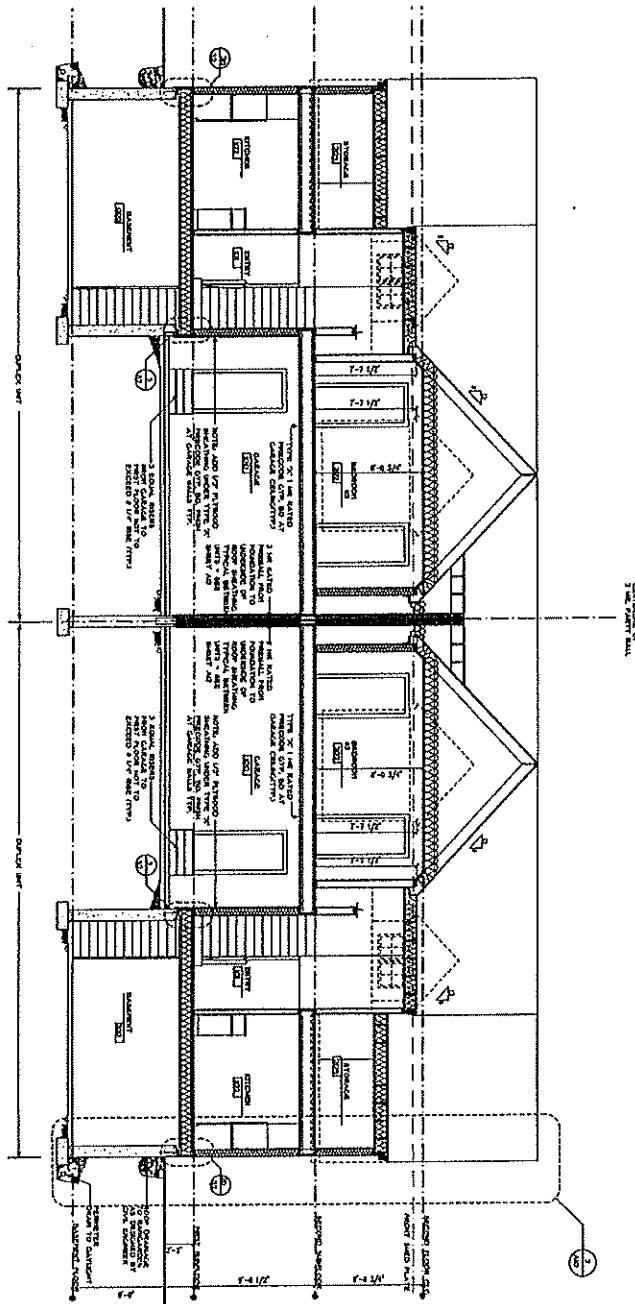
CORNER:
RIVER MARSH
LLC
213 WASHINGTON
MASSACHUSETTS

TYPICAL
BUILDING
ELEVATIONS
DATE: 3 DEC 2004
SCALE: 1/8" = 1'-0"

A2

LONGITUDINAL SECTION D THROUGH THREE BEDROOM DUPLEX

SCALE: 1/4" = 1'-0"



RIVER MARSH CONDOMINIUMS
WATER STREET
PEMBROKE, MASSACHUSETTS



REVISIONS

BUILDING
SECTIONS

SCALE: 1/4" = 1'-0"
DATE: 4 NOV. 2004
P.L. SECTION

A7

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: TABULATION OF PROPOSED BUILDINGS

In accordance with the Town of Pembroke Rules, a tabulation of proposed buildings by type, size (number of bedrooms, floor area) and ground coverage, and a summary showing the percentage of the tract to be occupied by buildings, by parking, and other paved vehicular areas, and by open areas is provided below.

The following Tabulation is provided in accordance with the Town of Pembroke's Supplemental Rules for Comprehensive Permit:

Type of Building	1.5 Story Residential Townhomes
Number of Buildings	14
Building Size	1,900-2,200 Square Feet / Unit
Number of Units	56
Size of Units	(11) 2 Bedroom Units – 1,900 Square Feet (45) 3 Bedroom Units - 2,100 Square Feet
Parking Coverage (includes road) (acres and as % of Site)	2.52 acres – 5 %
Other Paved Areas (acres and as % of Site)	2.24 acres – See above
Open Space (acres and as % of Site)	44.14 acres – 90.2%
Upland Open Space (acres and as % of Site)	16.73 acres – 34.2%
Total Impervious area on Site (acres and as % of Site)	4.76 acres – 9.73%

% of Coverage calculations based on total size of 48.9 acres.

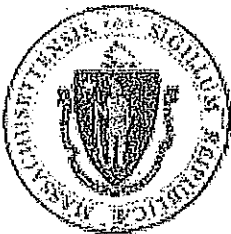
RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: PROJECT ELIGIBILITY

In accordance with the Town of Pembroke Rules and Regulations for Comprehensive Permits, Mass Housing's preliminary determination of Project Eligibility under the Comprehensive Permit Rules (the "Project Eligibility Determination") is provided and is incorporated into and made part of this application, together with the following enclosures:

1. Evidence of Limited Dividend Organization
2. Project Eligibility/Site Approval Letter
3. Site Control: Purchase & Sale Agreements
4. Application Materials submitted to MassHousing



The Commonwealth of Massachusetts
William Francis Galvin

Minimum Fee: \$500.00

Secretary of the Commonwealth, Corporations Division
One Ashburton Place, 17th floor
Boston, MA 02108-1512
Telephone: (617) 727-9640

Certificate of Organization
(General Laws Chapter 156C)

Identification Number: 001243831

1. The exact name of the limited liability company is: RIVER MARSH LLC

2a. Location of its principal office:

No. and Street: 293 WASHINGTON STREET
City or Town: NORWELL State: MA Zip: 02061 Country: USA

2b. Street address of the office in the Commonwealth at which the records will be maintained:

No. and Street: 293 WASHINGTON STREET
City or Town: NORWELL State: MA Zip: 02061 Country: USA

3. The general character of business, and if the limited liability company is organized to render professional service, the service to be rendered:

THE BUSINESS OF THE LLC IS TO ACQUIRE AND DEVELOP CERTAIN LAND IN PEMBROKE, MASSACHUSETTS IN COMPLIANCE WITH THE REQUIREMENTS OF G.L. C. 40B, §§ 20-23 AND THE REGULATIONS PROMULGATED THEREUNDER AND TO OTHERWISE CONDUCT ANY LAWFUL BUSINESS OR ENGAGE IN ANY LAWFUL ACTIVITY PERMITTED BY THE ACT.

4. The latest date of dissolution, if specified:

5. Name and address of the Resident Agent:

Name: BRIAN P. MURPHY
No. and Street: 293 WASHINGTON STREET
City or Town: NORWELL State: MA Zip: 02061 Country: USA

I, BRIAN P. MURPHY resident agent of the above limited liability company, consent to my appointment as the resident agent of the above limited liability company pursuant to G. L. Chapter 156C Section 12.

6. The name and business address of each manager, if any:

Title	Individual Name First, Middle, Last, Suffix	Address (no PO Box) Address, City or Town, State, Zip Code
MANAGER	BRIAN P. MURPHY	293 WASHINGTON STREET NORWELL, MA 02061 USA

7. The name and business address of the person(s) in addition to the manager(s), authorized to execute documents to be filed with the Corporations Division, and at least one person shall be named if there are no managers.

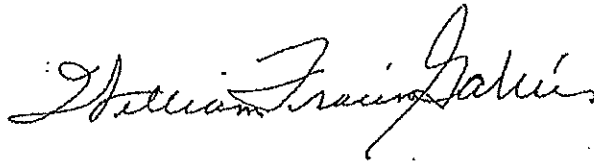
Title	Individual Name	Address (no PO Box)
-------	-----------------	---------------------

First, Middle, Last, Suffix	Address, City, or Town, State, Zip Code
8. The name and business address of the person(s) authorized to execute, acknowledge, deliver and record any recordable instrument purporting to affect an interest in real property:	
Title	Individual Name First, Middle, Last, Suffix
REAL PROPERTY	BRIAN P. MURPHY
Address (no PO Box) Address, City or Town, State, Zip Code	
293 WASHINGTON STREET NORWELL, MA 02061 USA	
9. Additional matters:	
<p>SIGNED UNDER THE PENALTIES OF PERJURY, this 13 Day of October, 2016, <u>BRIAN P. MURPHY</u> <i>(The certificate must be signed by the person forming the LLC.)</i></p>	
<small>© 2001 - 2016 Commonwealth of Massachusetts All Rights Reserved</small>	

THE COMMONWEALTH OF MASSACHUSETTS

I hereby certify that, upon examination of this document, duly submitted to me, it appears
that the provisions of the General Laws relative to corporations have been complied with,
and I hereby approve said articles; and the filing fee having been paid, said articles are
deemed to have been filed with me on:

October 13, 2016 03:03 PM

A handwritten signature in cursive script, reading "William Francis Galvin".

WILLIAM FRANCIS GALVIN

Secretary of the Commonwealth



DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
CINCINNATI OH 45999-0023

RIVER MARSH LLC
BRIAN P MURPHY MBR
293 WASHINGTON ST
NORWELL, MA 02061

Date of this notice: 12-02-2016

Employer Identification Number:
81-4571204

Form: SS-4

Number of this notice: CP 575 B

For assistance you may call us at:
1-800-829-4933

IF YOU WRITE, ATTACH THE
STUB AT THE END OF THIS NOTICE.

WE ASSIGNED YOU AN EMPLOYER IDENTIFICATION NUMBER

Thank you for applying for an Employer Identification Number (EIN). We assigned you EIN 81-4571204. This EIN will identify you, your business accounts, tax returns, and documents, even if you have no employees. Please keep this notice in your permanent records.

When filing tax documents, payments, and related correspondence, it is very important that you use your EIN and complete name and address exactly as shown above. Any variation may cause a delay in processing, result in incorrect information in your account, or even cause you to be assigned more than one EIN. If the information is not correct as shown above, please make the correction using the attached tear off stub and return it to us.

Based on the information received from you or your representative, you must file the following form(s) by the date(s) shown.

Form 1065

03/15/2017

If you have questions about the form(s) or the due date(s) shown, you can call us at the phone number or write to us at the address shown at the top of this notice. If you need help in determining your annual accounting period (tax year), see Publication 538, *Accounting Periods and Methods*.

We assigned you a tax classification based on information obtained from you or your representative. It is not a legal determination of your tax classification, and is not binding on the IRS. If you want a legal determination of your tax classification, you may request a private letter ruling from the IRS under the guidelines in Revenue Procedure 2004-1, 2004-1 I.R.B. 1 (or superseding Revenue Procedure for the year at issue). Note: Certain tax classification elections can be requested by filing Form 8832, *Entity Classification Election*. See Form 8832 and its instructions for additional information.

A limited liability company (LLC) may file Form 8832, *Entity Classification Election*, and elect to be classified as an association taxable as a corporation. If the LLC is eligible to be treated as a corporation that meets certain tests and it will be electing S corporation status, it must timely file Form 2553, *Election by a Small Business Corporation*. The LLC will be treated as a corporation as of the effective date of the S corporation election and does not need to file Form 8832.

To obtain tax forms and publications, including those referenced in this notice, visit our Web site at www.irs.gov. If you do not have access to the Internet, call 1-800-829-3676 (TTY/TDD 1-800-829-4059) or visit your local IRS office.



Massachusetts Housing Finance Agency
One Beacon Street, Boston, MA 02108

Tel: 617.854.1000
Fax: 617.854.1001 | www.masshousing.com
Video phone: 857.366.4157 or Relay: 711

February 15, 2018

River Marsh, LLC
Brian Murphy
293 Washington Street
Norwell, MA 02061

Re: River Marsh
Project Eligibility/Site Approval
MassHousing ID No. 916

Dear Mr. Murphy:

This letter is in response to your application as "Applicant" for a determination of Project Eligibility (Site Approval) pursuant to Massachusetts General Laws Chapter 40B ("Chapter 40B"), 760 CMR 56.00 (the "Regulations") and the Comprehensive Permit Guidelines issued by the Department of Housing and Community Development ("DHCD") (the "Guidelines") and, collectively with Chapter 40B and the Regulations, the "Comprehensive Permit Rules"; under the New England Fund ("NEF") Program (the "Program") of the Federal Home Loan Bank of Boston ("FHLBB").

You have proposed to build fifty-six (56) condominiums (the "Project") on 42.94 acres of land located on Water Street (the "Site") in Pembroke (the "Municipality").

In accordance with the Comprehensive Permit Rules, this letter is intended to be a written determination of Project Eligibility by MassHousing acting as Subsidizing Agency under the Guidelines, including Part V thereof, "Housing Programs In Which Funding Is Provided By Other Than A State Agency."

MassHousing has performed an on-site inspection of the Site, which local boards and officials were invited to attend, and has reviewed the pertinent information for the Project submitted by the Applicant, the Municipality and others in accordance with the Comprehensive Permit Rules.

Municipal Comments

Pursuant to the Regulations, the Municipality was given a thirty (30) day period in which to review the site approval application and submit comments to MassHousing. In response to a request from the Pembroke Board of Selectmen, this review period was extended to sixty (60) days. The Board of Selectmen provided an initial comment letter, received by MassHousing on February 27, 2017, identifying numerous concerns with the Project, and urging MassHousing to deny the Application for Site Approval.

Charles D. Baker, Governor | Michael J. Duffant, Chairman | Thomas J. Lyons, Acting Executive Director
Karyn E. Pollito, Lt. Governor | Ping Yiu Chai, Vice Chair | Karen E. Kelleher, Deputy Director

On July 26, 2017, MassHousing and the Municipality received revised site plans from the applicant, showing modifications made by the Applicant in response to feedback from MassHousing and the Municipality regarding the site layout and building design. The number of units was reduced from sixty-eight (68) units to fifty-six (56) units, and revisions were made to the original site plan, including the removal of proposed housing structures from the portion of the Site closest to the North River and pulling those units further away from areas subject to review under the Wetlands Protection Act.

Following receipt of the revised Site Plan, the Pembroke Board of Selectmen asked for and were granted an additional thirty (30) days to review the revised plans. On August 25, 2017, MassHousing received a second comment letter from the Pembroke Board of Selectmen stating that the revised Site Plan is slightly smaller and less obtrusive, but that they remained in opposition to the Project, and affirming that all of the comments included in the initial comment letter remained unchanged.

The following concerns were identified in their comments:

- The Selectmen's letter emphasized that part of the Site sits in extremely sensitive wetlands, and as such any development of this Site must be designed to protect the surrounding wetlands and ensure that the species of animals and plants found in the area are protected. They emphasized that the Project's stormwater collection and treatment system must prevent erosion and contamination to the nearby North River both during and after construction. They questioned the impact of a significant amount of new impervious surfaces (buildings and paved areas) on groundwater recharge patterns in this area.
- The Selectmen expressed concern about the additional traffic that would be generated by the Project, and associated safety impacts on area roadways and intersections, particularly the intersections at Water Street and Route 139. Pedestrian safety was also identified as a concern in light of the lack of sidewalks in this area.
- The Selectmen also provided comments from the Pembroke Fire Department. The Fire Department emphasized that the Project must be designed so as to ensure the maximum level of emergency access and fire protection. They outlined a variety of requirements for the Project including fire lanes, sufficient roadway widths and intersection radii to accommodate public safety vehicles, hydrants and interior fire suppression systems.
- Pembroke Selectmen expressed concerns about the sufficiency of the existing water supply and encouraged the implementation of water-saving facilities at the Project.

Community Comments

In addition to the comments from town officials, MassHousing received several letters and signed petitions from area residents, all of which expressed opposition to the proposed Project. Although letters from members of the community basically echoed the concerns identified by the local officials, the letters received are summarized below:

- Area residents expressed concern about potentially negative environmental impacts of the Project. They noted that portions of the Site have historically experienced flooding and expressed concern that Project grading could result in erosion and flooding impacts on adjacent properties. In addition, they are concerned that the Site supports a large and diverse

wildlife population and that the proposed Project may result in harm to wildlife and its associated habitat.

- Area residents voiced concern with existing traffic congestion on Water Street, and the possibility that the Project would exacerbate traffic volumes and further reduce the level of service at area intersections. Letters expressed the concern that increased traffic volume on area roadways would result in unsafe conditions for residents traveling onto Route 139.
- Area residents expressed concern that the proposed Project will deplete the groundwater supply.
- Area residents believe the proposed buildings are significantly out of scale within the context of the existing residential neighborhood.

MassHousing received a separate letter from the North & South Rivers Watershed Association Inc., dated August 28, 2017. This letter expressed the opinion that the density of the development threatens to undermine the scenic quality, wildlife habitat, water quality, and environmental health of the Site.

MassHousing was also contacted by several State Representatives including Josh Cutler, James Cantwell, Joan Meschino, David DeCoste, and two State Senators, Viriato deMacedo and Patrick O'Connor. The legislators collectively provided letters dated February 8, 2017 and August 31, 2017, expressing concerns about the proposed development. Representative Cutler and others reiterated constituent concerns about the potential impacts of the Project on area traffic, wetlands and natural resources and recommended that MassHousing not issue a Project Eligibility letter for this proposed Project.

MassHousing has carefully considered all municipal concerns and, to the extent possible within the context of Site Approval, has offered responses in the "recommendations" section of this letter. It is anticipated that the Municipality, through the comprehensive permit process, will thoroughly review the Project proposal and identify all conditions necessary to ensure consistency with "local needs" as defined in M.G.L. Chapter 40B, Section 20.

MassHousing Determination and Recommendations

MassHousing staff has determined that the Project appears generally eligible under the requirements of the Program, subject to final review of eligibility and to Final Approval. As a result of our review, we have made the findings as required pursuant to 760 CMR 56.04(1) and (4). Each such finding, with supporting reasoning, is set forth in further detail on Attachment 1 hereto.

Based on MassHousing's site and design review, and in light of feedback received from the Municipality, the following issues should be addressed in your application to the Zoning Board of Appeals, and you should be prepared to explore them more fully during the public hearing process:

- Development of this site will require resolution of all environmental conditions per laws, regulations and standards applicable to existing conditions and to the proposed use, including but not limited to compliance with all applicable statutory and regulatory restrictions relating to floodplain management, the protection of wetlands, river and wildlife habitats/conservation areas, as well as local and state environmental protection requirements

relating to the protection of the public water supply, stormwater runoff, wastewater treatment, and hazardous waste safety. The Applicant should provide evidence of such compliance prior to the issuance of a building permit for the Project.

- Plans for the Project must comply with all conditions contained in any Order of Conditions issued by the Conservation Commission or the Department of Environmental Protection in connection with the Project.
- The Applicant must comply with Title V regulations regarding the design and construction of individual wells, septic systems and wastewater treatment plants. The Applicant should provide evidence of such compliance prior to the issuance of a building permit for the Project.
- The Applicant should be prepared to provide a detailed traffic study assessing potential impacts of the Project on area roadways, including traffic volumes, crash rates, and the safety and level of service (LOS) of area intersections, and identifying appropriate traffic mitigation in compliance with all applicable state and local requirements governing site design.
- The traffic study or other professional site design process should address proposed on-site circulation and parking to ensure compliance with public safety standards and good design practice relative to drive-aisle widths, turning radii and sight distances along the Site drive and the parking areas through which it passes. The Applicant should be prepared to address concerns about provisions for safe pedestrian access and pedestrian/vehicular separation within the Site, sufficiency of resident and guest parking, and plans for snow storage.
- The Applicant should be prepared to provide detailed information relative to proposed water use, potential impacts on existing capacity, and appropriate mitigation.
- A landscape plan should be provided to address Municipal concerns, including a detailed planting plan as well as paving, lighting, and signage details and the location of outdoor dumpsters or other waste receptacles.

This Site Approval is expressly limited to the development of no more than fifty-six (56) homeownership units under the terms of the Program, of which not less than fourteen (14) of such units shall be restricted as affordable for low or moderate-income persons or families as required under the terms of the Guidelines. It is not a commitment or guarantee of financing and does not constitute a site plan or building design approval. Should you consider, prior to obtaining a Comprehensive Permit, the use of any other housing subsidy program, the construction of additional units or a reduction in the size of the Site, you may be required to submit a new Site Approval application for review by MassHousing. Should you consider a change in tenure type or a change in building type or height, you may be required to submit a new site approval application for review by MassHousing.

For guidance on the Comprehensive Permit review process, you are advised to consult the Guidelines. Further, we urge you to review carefully with legal counsel the M.G.L. c.40B Comprehensive Permit Regulations at 760 CMR 56.00.

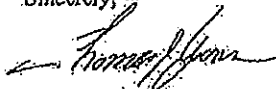
This approval will be effective for a period of two (2) years from the date of this letter. Should the Applicant not apply for a Comprehensive Permit within this period or should MassHousing not extend the effective period of this letter in writing, this letter shall be considered to have expired and no longer be in effect. In addition, the Applicant is required to notify MassHousing at the following times throughout this two-year period: (1) when the Applicant applies to the local ZBA for a Comprehensive Permit; (2) when the ZBA issues a decision and (3) if applicable, when any appeals are filed.

Should a Comprehensive Permit be issued, please note that prior to (i) commencement of construction of the Project or (ii) issuance of a building permit, the Applicant is required to submit to MassHousing a request for Final Approval of the Project (as it may have been amended) in accordance with the Comprehensive Permit Rules (see especially 760 CMR 56.04(07) and the Guidelines including, without limitation, Part III thereof concerning Affirmative Fair Housing Marketing and Resident Selection). Final Approval will not be issued unless MassHousing is able to make the same findings at the time of issuing Final Approval as required at Site Approval.

Please note that MassHousing may not issue Final Approval if the Comprehensive Permit contains any conditions that are inconsistent with the regulatory requirements of the New England Fund Program of the FHLLBB, for which MassHousing serves as Subsidizing Agency, as reflected in the applicable regulatory documents. In the interest of providing for an efficient review process and in order to avoid the potential lapse of certain appeal rights, the Applicant may wish to submit a "final draft" of the Comprehensive Permit to MassHousing for review. Applicants who avail themselves of this opportunity may avoid significant procedural delays that can result from the need to seek modification of the Comprehensive Permit after its initial issuance.

If you have any questions concerning this letter, please contact Michael Busby at (617) 854-1219.

Sincerely,



Thomas J. Lyons
Acting Executive Director

cc: Chrystal Konegay, Undersecretary, DHCD
The Honorable Virgilio M. deMacedo, State Senator
The Honorable Josh S. Cutler, State Representative
Willard J. Boulter, Jr., Chairman, Board of Selectmen
William Cullity, Chairman, Zoning Board of Appeals

Attachment I

760 CMR 56.04 Project Eligibility: Other Responsibilities of Subsidizing Agency
Section (4) Findings and Determinations

River Marsh, Project #916

After the close of a 30-day review period and extensions, MassHousing hereby makes the following findings, based upon its review of the application, and in consideration of information received during the site visit and from written comments:

(a) that the proposed Project appears generally eligible under the requirements of the housing subsidy program, subject to final approval under 760 CMR 56.04(7);

The Project is eligible under the NBF housing subsidy program and at least 25% of the units will be available to households earning at or below 80% of the Area Median Income (AMI), adjusted for household size, as published by the U.S. Department of Housing and Urban Development ("HUD"). The most recent HUD income limits indicate that 80% of the current applicable median income for a four-person household in Pembroke is \$78,150. A letter of interest was provided by South Shore Bank, a member bank of the Federal Home Loan Bank of Boston.

(b) that the site of the proposed Project is generally appropriate for residential development, taking into consideration information provided by the Municipality or other parties regarding municipal actions previously taken to meet affordable housing needs, such as inclusionary zoning, multifamily districts adopted under c.40A, and overlay districts adopted under c.40B, (such finding, with supporting reasoning, to be set forth in reasonable detail);

The Town of Pembroke does not have a DHCD approved Housing Production Plan. According to DHCD'S Chapter 40B Subsidized Housing Inventory (SHI), updated through December 5, 2017, Pembroke has 625 SHI units (9.6% of its housing inventory) and needs 23 additional SHI units in order to meet the 10% SHI threshold. The current zoning for the subject Site allows for residential use, and the proposed residential development would be compatible with surrounding uses.

(c) that the conceptual project design is generally appropriate for the site on which it is located, taking into consideration factors that may include proposed use, conceptual site plan and building massing, topography, environmental resources, and integration into existing development patterns (such finding, with supporting reasoning, to be set forth in reasonable detail);

Based on a site inspection by MassHousing staff, internal discussions, and a thorough review of the application, MassHousing finds that the Site is suitable for residential use and development and that such use would be compatible with surrounding uses, and would directly address the local need for housing.

It should be noted that the proposed site plan for River Marsh included in the original submittal to MassHousing on January 14, 2017 was significantly redesigned by the Applicant in response to feedback received from the community and MassHousing during the initial review process.

It is also important to note that the changes contained within the current version of the plan address specific issues that were the subject of a previous denial of a Project Eligibility Application by MassHousing for a similar project on the same Site dated September 9, 2005. Specifically, the revised plan has responded to the concerns raised about units located in close proximity to the North River and impacting both wetland and flood-sensitive resource areas. The revised plan, which reduced the number of proposed units from 68 to 56, eliminated the need for a wetland crossing. This significant change to the Project will mitigate impacts on nearby wetlands and result in an enhanced river corridor buffer, over and above the 300-foot setback established by the North River Protective Act.

Additionally, the Project benefits from means of access and egress that were not considered as part of the 2005 plan. The Site now features two (2) points of access and egress. Vehicles may connect to Route 139 east and the nearby Route 3 interchange via Cross Street. This alternative improves onsite safety by reducing the need for vehicles to connect to Route 139 east via a left turn from Water Street.

Many comments from local officials, legislative stakeholders, and residents questioned the anticipated impacts of the conceptual project design, especially with respect to traffic, stormwater management, wetlands protection, and septic system performance. These are all critical areas of local concern and the Comprehensive Permit Rules empower local zoning boards of appeal to impose conditions on the 40B developers that safeguard local health and safety concerns. MassHousing expects the Applicant to engage Pembroke Zoning Board of Appeals in a collaborative manner on all areas of local concern.

The following site plan review findings are made in response to the modified conceptual site plan:

Relationship to Adjacent Building Typology (including building massing, site arrangement, and architectural details):

The surrounding neighborhood is generally residential in character and is predominantly made up of single-family homes. The Developer intends to build 1.5 story, multi-unit, townhouse style residential buildings. The massing of the Project will be mitigated by the efforts to modulate the perceived height, bulk and scale of the proposed residential structures to create an appropriate transition to adjoining neighborhoods.

Relationship to Adjacent Streets

The subject is located in a suburban residential neighborhood in North Pembroke, approximately .75 miles west of Exit 12 on Route 3 and .15 miles north of Route 139, close to the Marshfield and Haverhill town lines. There appears to be adequate lines of sight for vehicles entering and exiting the proposed Site. In addition, the Applicant has proposed a secondary means of access/egress onto Water Street that provides an alternative route to Route 139 and Route 3.

Density

The Applicant proposes to build 56 townhouse condominiums on 49.94 acres, of which approximately 18.54 acres are buildable. The resulting density is 3.02 units per buildable acre, which is acceptable given the proposed housing type and the uses found in the surrounding context.

Conceptual Site Plan

The Developer has taken into consideration the site constraints, wetlands and topographical features of the Site to provide safe access and egress for future residents. The Site consists of 49.94 acres of

land, and 18.54 acres are buildable. The site plan largely concentrates development at the Site's central core, leaving large vegetated open areas and some uplands undeveloped. The homes will be clustered together in several areas to create a village-style community and allow for the use of a proposed common sewage disposal system. The wetland resources and the nearby North River are predominant features of the Site that may create open space opportunities, such as walking trails and recreational boating activities.

Topography

The subject property is gently rolling with slight variations in grade where the wetlands are located. The Site is characterized by numerous wetland areas. The topographic features of the Site have been considered in relationship to the proposed Project plans and do not constitute an impediment to development of the Site.

Environmental Resources

The Site is a large parcel with extensive natural resources and undisturbed wetland areas. Extensive wetlands found throughout the Site will limit the development to upland areas identified by the Developer. Development of the Site will require careful attention to current best management Practices to avoid any adverse impacts to the protected wetland resource areas. These resource areas will ultimately serve to break down the perceived massing of the Site, provide visual screening, and surround the residential portions of the Site with natural features. Wetland resources in these areas will be subject to further review by the local Conservation Commission under a Notice of Intent.

(d) that the proposed Project appears financially feasible within the housing market in which it will be situated (based on comparable rentals or sales figures);

The Project appears financially feasible based on a comparison of market sales submitted by the Applicant.

(e) that MassHousing finds that an initial pro forma has been reviewed, including a land valuation determination consistent with the Department's Guidelines, and the Project appears financially feasible and consistent with the Department's Guidelines for Cost Examination and Limitations on Profits and Distributions (if applicable) on the basis of estimated development costs;

The initial pro forma has been reviewed for the proposed residential use, and the Project appears financially feasible with a projected profit margin of 13.73%. In addition, a third-party appraisal commissioned by MassHousing has determined that the "As Is" land value for the Site of the proposed Project is \$1,130,000.

(f) that the Applicant is a public agency, a non-profit organization, or a Limited Dividend Organization, and it meets the general eligibility standards of the housing program; and

The Applicant must be organized as a Limited Dividend Organization prior to applying for Final Approval. MassHousing sees no reason this requirement could not be met given information reviewed to date. The Applicant meets the general eligibility standards of the NEF housing subsidy program and has executed an Acknowledgment of Obligations to restrict its profits in accordance with the applicable limited dividend provisions.

(g) that the Applicant controls the site, based on evidence that the Applicant or a related entity owns the site, or holds an option or contract to acquire such interest in the site, or has such other interest in the site as is deemed by the Subsidizing Agency to be sufficient to control the site.

The Applicant controls the entire 49.94-acre Site under a Purchase and Sale agreement with an expiration date of August 30, 2021.

PURCHASE AND SALE AGREEMENT

This 6th day of December, 2016

From the Office of:
Warren F. Baker
Baker, Braverman & Barbadoro
300 Crown Colony Drive, Suite 500
Quincy, MA 02169

1. PARTIES
AND MAILING
ADDRESSES

Red Castle, LLC

Hereinafter collectively called the SELLER, or SELLER's designated nominee, agrees to SELL and

River Marsh LLC or its nominee

hereinafter called the BUYER or PURCHASER, agrees to BUY, upon the terms hereinafter set forth,

2. DESCRIPTION

the following described premises: the real estate known as 274 Water Street, Pembroke, MA 02359 with Parcel ID E15-17A, depicted on a certain conceptual plan, prepared by McKenzie Engineering Group and attached hereto, and more particularly described as Lot 1 on a plan entitled "Plan of Land, Water Street, Pembroke, MA," Scale: 1" = 100', dated May 16, 1985, drawn by Loring H. Jacobs, Co., duly recorded with Plymouth County Registry of Deeds as Plan Number 570 of 1985 in Plan Book 25, Page 885, including all easements, restrictions, and rights of way being a part thereof. For title reference see deed recorded with the Plymouth County Registry of Deeds in Book 14929, Page 285.

3. BUILDINGS,
STRUCTURES,
IMPROVEMENTS,
FIXTURES

VACANT LAND and a single family residence Included in the sale as a part of said premises are the buildings, structures, and improvements now thereon, and the fixtures belonging to the SELLER and used in connection therewith.

4. TITLE DEED

Said premises are to be conveyed by a good and sufficient quitclaim deed running to the BUYER, or to the nominee designated by the BUYER by written notice to the SELLER at least seven (7) days before the deed is to be delivered as herein provided, and said deed shall convey a good and clear record and marketable title thereto, free from encumbrances, except

- (a) Provisions of existing building and zoning laws;
- (b) Existing rights and obligations in party walls which are not the subject of written agreement;
- (c) Such taxes for the then current fiscal year as are not due and payable on the date of the delivery of such deed;
- (d) Betterment assessments after the date of this agreement;
- (e) Federal, state and local laws, ordinances, bylaws, rules and regulations relating to the use of land; and
- (f) Easements, restrictions and reservations of record, if any.

5. PLANS

If said deed refers to a plan necessary to be recorded therewith the SELLER shall deliver such plan with the deed in form adequate for recording or registration.

6. REGISTERED
TITLE

In addition to the foregoing, if the title to said premises is registered, said deed shall be in form sufficient to entitle the BUYER to a Certificate of Title of said premises, and the SELLER shall deliver with said deed all instruments, if any, necessary to enable the BUYER to obtain such Certificate of Title.

7. PURCHASE PRICE

The agreed purchase price for said premises is

Five Hundred and Fifty Thousand dollars (\$550,000.00) , of which

\$

\$ 1,000.00

\$ 549,000.00

\$

\$ 550,000.00

to be paid as a deposit herewith,
are to be paid at the time of delivery and recording of the deed in cash, or
by certified, cashier's, treasurer's or bank check(s) or attorney client fund
check(s).

TOTAL

8. TIME FOR PERFORMANCE; DELIVERY OF DEED

Such deed is to be delivered at 10:00 a.m. on the at the time as further determined and provided herein at the Plymouth County Registry of Deeds or at the office of the conveyancing attorney provided that the same is within Plymouth County. It is agreed that time is of the essence of this agreement.

9. POSSESSION AND CONDITION OF PREMISE.

Full possession of said premises, free of all tenants and occupants, is to be delivered at the time of the delivery of the deed, said premises to be then (a) in the same condition as they now are, reasonable use and wear thereof excepted, and (b) not in violation of said building and zoning laws, and (c) in compliance with provisions of any instrument referred to in clause 4 hereof. The BUYER shall be entitled personally to inspect said premises prior to the delivery of the deed in order to determine whether the condition thereof complies with the terms of this clause.

10. EXTENSION TO PERFECT TITLE OR MAKE PREMISES CONFORM

If the SELLER shall be unable to give title or to make conveyance, or to deliver possession of the premises, all as herein stipulated, or if at the time of the delivery of the deed the premises do not conform with the provisions hereof, then the SELLER shall use reasonable efforts, provided that under no circumstances shall reasonable efforts be deemed to require Seller to expend more than \$1,000 in the aggregate to remove any defects in title, or to deliver possession as provided herein, or to make the said premises conform to the provisions hereof, as the case may be, in which event, the time for performance hereof shall be extended for a period of thirty (30) days.

11. FAILURE TO PERFECT TITLE OR MAKE PREMISES CONFORM, etc

If at the expiration of the extended time the SELLER shall have failed so to remove any defects in title, deliver possession, or make the premises conform, as the case may be, all as herein agreed, or if at any time during the period of this agreement or any extension thereof, the holder of a mortgage on said premises shall refuse to permit the insurance proceeds, if any, to be used for such purposes, then any payments made under this agreement shall be forthwith refunded and any interest thereon and all other obligations of the parties hereto shall cease and this agreement shall be void without recourse to the parties hereto.

12. BUYER's ELECTION TO ACCEPT TITLE

The BUYER shall have the election, at either the original or any extended time for performance, to accept such title as the SELLER can deliver to the said premises in their then condition and to pay therefore the purchase price without deduction, in which case the SELLER shall convey such title, except that in the event of such conveyance in accord with the provisions of this clause, if the said premises shall have been damaged by fire or casualty insured against, then the SELLER shall, unless the SELLER has previously restored the premises to their former condition, either

- (a) pay over or assign to the BUYER, on delivery of the deed, all amounts recovered or recoverable on account of such insurance, less any amounts reasonably expended by the SELLER for any partial restoration, or
- (b) If a holder of a mortgage on said premises shall not permit the insurance proceeds or a part thereof to be used to restore the said premises to their former condition or to be so paid over or assigned, give to the BUYER a credit against the purchase price, on delivery of the deed, equal to said amounts so recovered or recoverable and retained by the holder of the said mortgage less any amounts reasonably expended by the SELLER for any partial restoration.

13. ACCEPTANCE OF DEED

The acceptance of a deed by the BUYER or his nominee as the case may be, shall be deemed to be a full performance and discharge of every agreement and obligation herein contained or expressed, except such as are, by the terms hereof, to be performed after the delivery of said deed.

14. USE OF MONEY TO CLEAR TITLE

To enable the SELLER to make conveyance as herein provided, the SELLER may, at the time of delivery of the deed, use the purchase money or any portion thereof to clear the title of any or all encumbrances or interests, provided that all instruments so procured are recorded simultaneously with the delivery of said deed or thereafter in accordance with accepted practice.

15. INSURANCE

Until the delivery of the deed, the SELLER shall maintain insurance on said premises as follows:

<i>Type of Insurance</i>	<i>Amount of Coverage</i>
--------------------------	---------------------------

Fire and Extended Coverage

As presently insured

16. ADJUSTMENTS

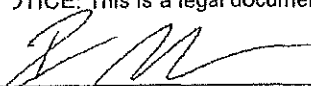
Taxes for the then current fiscal year, shall be apportioned as of the day of performance of this agreement and the net amount thereof shall be added to or deducted from, as the case may be, the purchase price payable by the BUYER at the time of delivery of the deed.

17. ADJUSTMENT OF UNASSESSED AND ABATED TAXES If the amount of said taxes is not known at the time of the delivery of the deed, they shall be apportioned on the basis of the taxes assessed for the preceding fiscal year, with a reapportionment as soon as the new tax rate and valuation can be ascertained; and, if the taxes which are to be apportioned shall thereafter be reduced by abatement, the amount of such abatement, less the reasonable cost of obtaining the same, shall be apportioned between the parties, provided that neither party shall be obligated to institute or prosecute proceedings for an abatement unless herein otherwise agreed.
18. BROKER'S FEE A Broker's fee for professional services of N/A
19. BROKER(S) WARRANTY The Broker(s) named herein N/A warrant(s) that the Broker(s) is(are) duly licensed as such by the Commonwealth of Massachusetts.
20. DEPOSIT All deposits made hereunder shall be held in escrow by Sellers as escrow agent subject to the terms of this agreement and shall be duly accounted for at the time for performance of this agreement. In the event of any disagreement between the parties, the escrow agent may retain all deposits made under this agreement pending instructions mutually given by the SELLER and the BUYER or a Court of competent jurisdiction. Any interest earned on deposit shall be split evenly between BUYER and SELLER at closing.
21. BUYER'S DEFAULT; DAMAGES If the BUYER shall fail to fulfill the BUYER's agreements herein, all deposits made hereunder by the BUYER shall be retained by the SELLER as liquidated damages and this shall be the Seller's sole and exclusive remedy both at law and/or in equity. Damages from a breach of BUYER'S obligations hereunder are difficult to ascertain at the time of the signing of this Agreement and the parties agree that the amount is a reasonable estimate, at this time, of the SELLER'S expected damages.
22. RELEASE BY HUSBAND OR WIFE The SELLER's spouse hereby agrees to join in said deed and to release and convey all statutory and other rights and interests in said premises.
23. BROKER AS PARTY The Broker(s) named herein join(s) in this agreement and become(s) a party hereto, insofar as any provisions of this agreement expressly apply to the Broker(s), and to any amendments or modifications of such provisions to which the Broker(s) agree(s) in writing.
24. LIABILITY OF TRUSTEE, SHAREHOLDER, BENEFICIARY, etc. If the SELLER or BUYER executes this agreement in a representative or fiduciary capacity, only the principal or the estate represented shall be bound, and neither the SELLER or BUYER so executing, nor any shareholder or beneficiary of any trust, shall be personally liable for any obligation, express or implied, hereunder.
25. WARRANTIES AND REPRESENTATIONS The BUYER acknowledges that the BUYER has not been influenced to enter into this transaction nor has he relied upon any warranties or representations not set forth or incorporated in this agreement or previously made in writing, except for the following additional warranties and representations, if any, made by either the SELLER or the Broker(s): None. Buyer is purchasing the property in its "AS IS" condition, except as set forth herein.
26. CONSTRUCTION OF AGREEMENT This instrument, executed in multiple counterparts, is to be construed as a Massachusetts contract, is to take effect as a sealed instrument, sets forth the entire contract between the parties, is binding upon and enures to the benefit of the parties hereto and their respective heirs, devisees, executors, administrators, successors and assigns, and may be cancelled, modified or amended only by a written instrument executed by both the SELLER and the BUYER. If two or more persons are named herein as BUYER their obligations hereunder shall be joint and several. The captions and marginal notes are used only as a matter of convenience and are not to be considered a part of this agreement or to be used in determining the intent of the parties to it.
27. LEAD PAINT LAW The Buyer acknowledges that Buyer has been informed that under Massachusetts law, whenever a child or children under six years of age resides in any residential premises in which any paint, plaster or other accessible material contains dangerous levels of lead said paint, plaster or other material must be removed so as to make it inaccessible to children under six years of age.
28. SMOKE DETECTORS AND CARBON MONOXIDE The Buyer waives its right to have Seller, at the time of the delivery of the deed, deliver a certificate from the fire department of the city or town in which said premises are located stating that said premises have been equipped with approved smoke detectors in conformity with applicable law. The Buyer intends to use said property as vacant land.

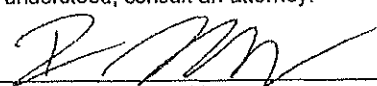
PROVISIONS

See Rider "A" attached hereto and incorporated herein.

NOTICE: This is a legal document that creates binding obligations. If not understood, consult an attorney.



Red Castle, LLC, SELLER
By: Brian P. Murphy, its Manager



River Marsh LLC, BUYER
By: Brian P. Murphy, its Manager

RIDER A TO PURCHASE AND SALE AGREEMENT

SELLER: Red Castle, LLC

BUYER: River Marsh LLC

PREMISES: Parcel known as 274 Water Street, Pembroke, MA

DATE: December 6, 2016

Notwithstanding anything to the contrary set forth in the Purchase and Sale Agreement, the following provisions are hereby inserted. To the extent the provisions of this Rider A contradict with the terms of the Agreement, the provisions of this Rider A shall be deemed to be superseding.

30. Permit Condition. The obligations of the BUYER hereunder shall be conditioned upon the BUYER obtaining applicable permits, after applicable appeals, for the construction of a so-called 40B project including without limitation all Comprehensive Permits, building permits, Board of Health Permits, Conservation Orders of Conditions required for the construction of such multiunit affordable Housing Project. In the event BUYER is unable to obtain such permits and so notifies the SELLER, on or before January 1, 2021, by mail posted, this agreement shall terminate and all deposits and interest or dividends thereon hereunder shall be returned promptly. BUYER has the authority to file and apply for all necessary applications and permits under this paragraph and will provide copies of same to SELLER in advance for reasonable review and comment. Such notice date shall be automatically extended in the event of any pending appeal or 180 days beyond the granting of all such permits.

31. Notice. Any notice required or permitted under this Agreement shall be in writing delivered by hand or certified mail, return receipt requested (charges pre-paid), posted as of the date required, or by facsimile, to the following:

To the SELLER: Red Castle, LLC
293 Washington St
Norwell, Ma 02061

To the BUYER: River Marsh LLC
293 Washington Street
Norwell, Ma 02061

with a copy to: Warren F. Baker, Esq.
Baker, Braverman & Barbadoro, P.C.
300 Crown Colony Drive, Suite 500
Quincy, MA 02169
(781) 848-9610 (781) 848-9790 (fax)
E-Mail: warrenb@bbb-lawfirm.com

In order to facilitate the execution and delivery of certain documents contemplated hereby, the parties grant to their respective attorneys named above the actual authority to execute and deliver on each party's behalf any (a) agreement modifying the time for the performance of any event hereunder, or (b) any notice that may be given under this Agreement, and the parties may rely upon the signature of such attorneys (including faxed signatures) unless a party has disclaimed the authority granted herein by written notice given to the other party as provided above.

32. Title Provisions. Except as otherwise provided for within this Agreement, in matters respecting title to the premises, standards of the Massachusetts Real Estate Bar Association shall be determinative where applicable.

33. Inspection and Representations. BUYER represents that he has have made a total examination of the Premises, the neighborhood, the surrounding areas, the municipality in which the Premises are located, and all legal issues (excepting title) pertaining to the purchase of the Premises, including without limitation, building code and zoning matters, and after negotiations is purchasing the property and paying the purchase price in accordance with the Agreement based on his assessment and examination of all of the above. BUYER warrants that he shall rely on such examinations, that he is satisfied with the results of such examinations, and that SELLER and BROKER have made no warranties or representations, express or implied, upon which BUYER has relied concerning the condition of the Premises, or other matters referred to above. BUYER further acknowledges that the current condition of the Premises has been considered in establishing the Purchase Price set forth in this Agreement. Without limiting the generality of the foregoing, the parties acknowledge and agree that the Premises shall be sold strictly on an "as is," "where is," and "with all defects" basis, without representation or warranty, express, implied or statutory, of any kind, including, without limitation, representation or warranty as to condition (structural, mechanical or otherwise), construction, compliance with law, habitability, merchantability or fitness for any purpose, all of which are hereby disclaimed and which BUYER hereby waives. The provisions of this paragraph shall survive the delivery of the deed.

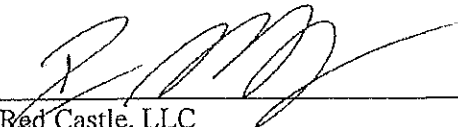
34. Entry to Premises. BUYER shall have the right to enter the premises at reasonable times prior to the Closing Date ("Due Diligence Period") for the purposes of showing the property to prospective lenders, for the taking of measurements, or for making reasonable inspections of purpose. BUYER shall indemnify and hold SELLER harmless from all damages, costs, loss, and liability associated with said access. BUYER shall have the right to inspect and examine the Property to the extent BUYER deems necessary in its sole discretion, to determine the condition of the Property and the suitability of the Premises for its development. BUYER's representatives, consultants, agents and employees shall, during regular business hours, (a) have the right to cause complete environmental reviews and site assessments and inspections of the Property to be made, (b) have access to all buildings, improvements, and (c) conduct all other necessary feasibility studies, title reports, surveys, soils tests, ground water tests, engineering studies, examination of zoning status, building and use permits, sign permits and all other permits required for the Property. While conducting such investigations, tests and studies, BUYER shall not unreasonably disturb or interfere the Property. Prior to the expiration of the

Due Diligence Period, BUYER shall notify Seller if BUYER is not satisfied with such investigations and reviews and BUYER shall have the right, in its sole and absolute discretion, to terminate this Agreement and receive a refund of its Deposit, in which event, except as specifically provided otherwise in this Agreement, the parties shall have no further obligations to each other under this Agreement


35. Entire Agreement. This document shall constitute the entire agreement of the parties regarding the subject matter hereof. It may not be altered or amended except by a writing signed by the parties. This instrument, executed in triplicate, is to take effect as a sealed instrument, is binding upon and inures to the benefit of the parties hereto and their respective heirs, devisees, executors, administrators, successors and assigns, and may be canceled, modified or amended only by a written instrument executed by both the SELLER and the BUYER. If two or more persons are named herein as BUYER their obligations hereunder shall be joint and several.

36. Closing. The Closing shall occur upon notice to the Sellers by the Buyer on or within 180 from the receipt of all applicable and necessary permits for the construction of the affordable housing development of Buyer's design and the expiration of all appeal periods without appeal, including without limitation building permits issued by the Town of Pembroke.

SELLER:


Red Castle, LLC
By: Brian P. Murphy, its Manager

BUYER


River Marsh LLC
By: Brian P. Murphy, its Manager

PURCHASE AND SALE AGREEMENT

This 6th day of December, 2016

From the Office of:
Warren F. Baker
Baker, Braverman & Barbadoro
300 Crown Colony Drive, Suite 500
Quincy, MA 02169

1. PARTIES
AND MAILING
ADDRESSES

William J. Murphy, Jr., Trustee of Demos Realty Trust u/d/t dated August 29, 1973 recorded in Plymouth County Registry of Deeds, Registered Land Division, Document #153347
Hereinafter collectively called the SELLER, or SELLER's designated nominee, agrees to SELL and

River Marsh LLC or its nominee
hereinafter called the BUYER or PURCHASER, agrees to BUY, upon the terms hereinafter set forth,

2. DESCRIPTION

the following described premises: the real estate located off of the westerly side of Water Street, Pembroke, MA 02359 with Parcel ID E15-17 depicted on a certain conceptual plan, prepared by McKenzie Engineering Group and attached hereto, and more particularly described as Lot 4A on a plan entitled "Plan of Land, Water Street, Pembroke, Massachusetts," dated April 9, 1986, drawn by Loring H. Jacobs, Co., recorded with Plymouth County Registry of Deeds as Plan Number 554 of 1986 in Plan Book 27, Page 207, including all easements, restrictions, and rights of way being a part thereof. For title reference see deed recorded with the Plymouth County Registry of Deeds in Book 6795, Page 272.

3. BUILDINGS,
STRUCTURES,
IMPROVEMENTS,
FIXTURES

VACANT LAND.

4. TITLE DEED

Said premises are to be conveyed by a good and sufficient quitclaim deed running to the BUYER, or to the nominee designated by the BUYER by written notice to the SELLER at least seven (7) days before the deed is to be delivered as herein provided, and said deed shall convey a good and clear record and marketable title thereto, free from encumbrances, except
(a) Provisions of existing building and zoning laws;
(b) Existing rights and obligations in party walls which are not the subject of written agreement;
(c) Such taxes for the then current fiscal year as are not due and payable on the date of the delivery of such deed;
(d) Betterment assessments after the date of this agreement;
(e) Federal, state and local laws, ordinances, bylaws, rules and regulations relating to the use of land;
and
(f) Easements, restrictions and reservations of record, if any.

5. PLANS

If said deed refers to a plan necessary to be recorded therewith the SELLER shall deliver such plan with the deed in form adequate for recording or registration.

6. REGISTERED
TITLE

In addition to the foregoing, if the title to said premises is registered, said deed shall be in form sufficient to entitle the BUYER to a Certificate of Title of said premises, and the SELLER shall deliver with said deed all instruments, if any, necessary to enable the BUYER to obtain such Certificate of Title.

7. PURCHASE PRICE

The agreed purchase price for said premises is

One Million Nine Hundred and Fifty Thousand Dollars (\$1,950,000.00) -----, of which

\$ 5,000.00

\$ 1,945,000.00

\$

\$ 1,950,000.00

to be paid as a deposit herewith,

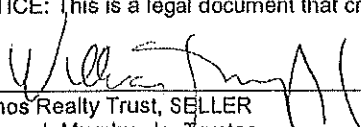
are to be paid at the time of delivery and recording of the deed in cash, or by certified, cashier's, treasurer's or bank check(s) or attorney client fund check(s).


TOTAL

8. TIME FOR PERFORMANCE; DELIVERY OF DEED
- Such deed is to be delivered at 10:00 a.m. on the at the time as further determined and provided herein at the Plymouth County Registry of Deeds or at the office of the conveyancing attorney provided that the same is within Plymouth County. It is agreed that time is of the essence of this agreement.
9. POSSESSION AND CONDITION OF PREMISE.
- Full possession of said premises, free of all tenants and occupants, is to be delivered at the time of the delivery of the deed, said premises to be then (a) in the same condition as they now are, reasonable use and wear thereof excepted, and (b) not in violation of said building and zoning laws, and (c) in compliance with provisions of any instrument referred to in clause 4 hereof. The BUYER shall be entitled personally to inspect said premises prior to the delivery of the deed in order to determine whether the condition thereof complies with the terms of this clause.
10. EXTENSION TO PERFECT TITLE OR MAKE PREMISES CONFORM
- If the SELLER shall be unable to give title or to make conveyance, or to deliver possession of the premises, all as herein stipulated, or if at the time of the delivery of the deed the premises do not conform with the provisions hereof, then the SELLER shall use reasonable efforts, provided that under no circumstances shall reasonable efforts be deemed to require Seller to expend more than \$1,000 in the aggregate to remove any defects in title, or to deliver possession as provided herein, or to make the said premises conform to the provisions hereof, as the case may be, in which event, the time for performance hereof shall be extended for a period of thirty (30) days.
11. FAILURE TO PERFECT TITLE OR MAKE PREMISES CONFORM, etc
- If at the expiration of the extended time the SELLER shall have failed so to remove any defects in title, deliver possession, or make the premises conform, as the case may be, all as herein agreed, or if at any time during the period of this agreement or any extension thereof, the holder of a mortgage on said premises shall refuse to permit the insurance proceeds, if any, to be used for such purposes, then any payments made under this agreement shall be forthwith refunded and any interest thereon and all other obligations of the parties hereto shall cease and this agreement shall be void without recourse to the parties hereto.
12. BUYER's ELECTION TO ACCEPT TITLE
- The BUYER shall have the election, at either the original or any extended time for performance, to accept such title as the SELLER can deliver to the said premises in their then condition and to pay therefore the purchase price without deduction, in which case the SELLER shall convey such title, except that in the event of such conveyance in accord with the provisions of this clause, if the said premises shall have been damaged by fire or casually insured against, then the SELLER shall, unless the SELLER has previously restored the premises to their former condition, either
- (a) pay over or assign to the BUYER, on delivery of the deed, all amounts recovered or recoverable on account of such insurance, less any amounts reasonably expended by the SELLER for any partial restoration, or
- (b) If a holder of a mortgage on said premises shall not permit the insurance proceeds or a part thereof to be used to restore the said premises to their former condition or to be so paid over or assigned, give to the BUYER a credit against the purchase price, on delivery of the deed, equal to said amounts so recovered or recoverable and retained by the holder of the said mortgage less any amounts reasonably expended by the SELLER for any partial restoration.
13. ACCEPTANCE OF DEED
- The acceptance of a deed by the BUYER or his nominee as the case may be, shall be deemed to be a full performance and discharge of every agreement and obligation herein contained or expressed, except such as are, by the terms hereof, to be performed after the delivery of said deed.
14. USE OF MONEY TO CLEAR TITLE
- To enable the SELLER to make conveyance as herein provided, the SELLER may, at the time of delivery of the deed, use the purchase money or any portion thereof to clear the title of any or all encumbrances or interests, provided that all instruments so procured are recorded simultaneously with the delivery of said deed or thereafter in accordance with accepted practice.
15. INSURANCE
- Until the delivery of the deed, the SELLER shall maintain insurance on said premises as follows:
- | Type of Insurance | Amount of Coverage |
|----------------------------|----------------------|
| Fire and Extended Coverage | As presently insured |
16. ADJUSTMENTS
- Taxes for the then current fiscal year, shall be apportioned as of the day of performance of this agreement and the net amount thereof shall be added to or deducted from, as the case may be, the purchase price payable by the BUYER at the time of delivery of the deed.

17. ADJUSTMENT OF UNASSESSED AND ABATED TAXES If the amount of said taxes is not known at the time of the delivery of the deed, they shall be apportioned on the basis of the taxes assessed for the preceding fiscal year, with a reapportionment as soon as the new tax rate and valuation can be ascertained; and, if the taxes which are to be apportioned shall thereafter be reduced by abatement, the amount of such abatement, less the reasonable cost of obtaining the same, shall be apportioned between the parties, provided that neither party shall be obligated to institute or prosecute proceedings for an abatement unless herein otherwise agreed.
18. BROKER'S FEE A Broker's fee for professional services of N/A
19. BROKER(S) WARRANTY The Broker(s) named herein N/A warrant(s) that the Broker(s) is(are) duly licensed as such by the Commonwealth of Massachusetts.
20. DEPOSIT All deposits made hereunder shall be held in escrow by Sellers as escrow agent subject to the terms of this agreement and shall be duly accounted for at the time for performance of this agreement. In the event of any disagreement between the parties, the escrow agent may retain all deposits made under this agreement pending instructions mutually given by the SELLER and the BUYER or a Court of competent jurisdiction. Any interest earned on deposit shall be split evenly between BUYER and SELLER at closing.
21. BUYER'S DEFAULT; DAMAGES If the BUYER shall fail to fulfill the BUYER's agreements herein, all deposits made hereunder by the BUYER shall be retained by the SELLER as liquidated damages and this shall be the Seller's sole and exclusive remedy both at law and/or in equity. Damages from a breach of BUYER'S obligations hereunder are difficult to ascertain at the time of the signing of this Agreement and the parties agree that the amount is a reasonable estimate, at this time, of the SELLER'S expected damages.
22. RELEASE BY HUSBAND OR WIFE The SELLER's spouse hereby agrees to join in said deed and to release and convey all statutory and other rights and interests in said premises.
23. BROKER AS PARTY The Broker(s) named herein join(s) in this agreement and become(s) a party hereto, insofar as any provisions of this agreement expressly apply to the Broker(s), and to any amendments or modifications of such provisions to which the Broker(s) agree(s) in writing.
24. LIABILITY OF TRUSTEE, SHAREHOLDER, BENEFICIARY, etc. If the SELLER or BUYER executes this agreement in a representative or fiduciary capacity, only the principal or the estate represented shall be bound, and neither the SELLER or BUYER so executing, nor any shareholder or beneficiary of any trust, shall be personally liable for any obligation, express or implied, hereunder.
25. WARRANTIES AND REPRESENTATIONS The BUYER acknowledges that the BUYER has not been influenced to enter into this transaction nor has he relied upon any warranties or representations not set forth or incorporated in this agreement or previously made in writing, except for the following additional warranties and representations, if any, made by either the SELLER or the Broker(s): None. Buyer is purchasing the property in its "AS IS" condition, except as set forth herein.
26. CONSTRUCTION OF AGREEMENT This instrument, executed in multiple counterparts, is to be construed as a Massachusetts contract, is to take effect as a sealed instrument, sets forth the entire contract between the parties, is binding upon and enures to the benefit of the parties hereto and their respective heirs, devisees, executors, administrators, successors and assigns, and may be cancelled, modified or amended only by a written instrument executed by both the SELLER and the BUYER. If two or more persons are named herein as BUYER their obligations hereunder shall be joint and several. The captions and marginal notes are used only as a matter of convenience and are not to be considered a part of this agreement or to be used in determining the intent of the parties to it.
27. LEAD PAINT LAW VACANT LAND
28. SMOKE DETECTORS AND CARBON MONOXIDE VACANT LAND
29. ADDITIONAL PROVISIONS The initialed riders, if any, attached hereto, are incorporated herein by reference.
See Rider "A" attached hereto and incorporated herein.

NOTICE: This is a legal document that creates binding obligations. If not understood, consult an attorney.


Demos Realty Trust, SELLER
William J. Murphy, Jr., Trustee


River Marsh, LLC, BUYER
By: Brian P. Murphy, its Manager

RIDER A TO PURCHASE AND SALE AGREEMENT

SELLER: William J. Murphy, Jr., as Trustee of Demos Realty Trust u/d/t dated August 29, 1973 recorded in Plymouth County Registry of Deeds, Registered Land Division, Document #153347

BUYER: River Marsh LLC

PREMISES: Lot located on the westerly side of Water Street, Pembroke, MA, identified as Parcel # E15-17 by Town of Pembroke property assessors.

DATE: December 6, 2016

Notwithstanding anything to the contrary set forth in the Purchase and Sale Agreement, the following provisions are hereby inserted. To the extent the provisions of this Rider A contradict with the terms of the Agreement, the provisions of this Rider A shall be deemed to be superseding.

30. Permit Condition. The obligations of the BUYER hereunder shall be conditioned upon the BUYER obtaining applicable permits, after applicable appeals, for the construction of a so-called 40B project including without limitation all Comprehensive Permits, building permits, Board of Health Permits, Conservation Orders of Conditions required for the construction of such multiunit affordable Housing Project. In the event BUYER is unable to obtain such permits and so notifies the SELLER, on or before January 1, 2022, by mail posted, this agreement shall terminate and all deposits and interest or dividends thereon hereunder shall be returned promptly. BUYER has the authority to file and apply for all necessary applications and permits under this paragraph and will provide copies of same to SELLER in advance for reasonable review and comment. Such notice date shall be automatically extended in the event of any pending appeal or 180 days beyond the granting of all such permits.

31. Notice. Any notice required or permitted under this Agreement shall be in writing delivered by hand or certified mail, return receipt requested (charges pre-paid), posted as of the date required, or by facsimile, to the following:

To the SELLER: William J. Murphy, Jr., Trustee
Demos Realty Trust
293 Washington Street
Norwell, MA 02061

To the BUYER: River Marsh LLC
293 Washington Street
Norwell, MA 02061

with a copy to:

Warren F. Baker, Esq.
Baker, Braverman & Barbadoro, P.C.
300 Crown Colony Drive, Suite 500
Quincy, MA 02169
(781) 848-9610 (781) 848-9790 (fax)
E-Mail: warrenb@bbb-lawfirm.com

In order to facilitate the execution and delivery of certain documents contemplated hereby, the parties grant to their respective attorneys named above the actual authority to execute and deliver on each party's behalf any (a) agreement modifying the time for the performance of any event hereunder, or (b) any notice that may be given under this Agreement, and the parties may rely upon the signature of such attorneys (including faxed signatures) unless a party has disclaimed the authority granted herein by written notice given to the other party as provided above.

32. Title Provisions. Except as otherwise provided for within this Agreement, in matters respecting title to the premises, standards of the Massachusetts Real Estate Bar Association shall be determinative where applicable.

33. Inspection and Representations. BUYER represents that he has have made a total examination of the Premises, the neighborhood, the surrounding areas, the municipality in which the Premises are located, and all legal issues (excepting title) pertaining to the purchase of the Premises, including without limitation, building code and zoning matters, and after negotiations is purchasing the property and paying the purchase price in accordance with the Agreement based on his assessment and examination of all of the above. BUYER warrants that he shall rely on such examinations, that he is satisfied with the results of such examinations, and that SELLER and BROKER have made no warranties or representations, express or implied, upon which BUYER has relied concerning the condition of the Premises, or other matters referred to above. BUYER further acknowledges that the current condition of the Premises has been considered in establishing the Purchase Price set forth in this Agreement. Without limiting the generality of the foregoing, the parties acknowledge and agree that the Premises shall be sold strictly on an "as is," "where is," and "with all defects" basis, without representation or warranty, express, implied or statutory, of any kind, including, without limitation, representation or warranty as to condition (structural, mechanical or otherwise), construction, compliance with law, habitability, merchantability or fitness for any purpose, all of which are hereby disclaimed and which BUYER hereby waives. The provisions of this paragraph shall survive the delivery of the deed.

34. Entry to Premises. BUYER shall have the right to enter the premises at reasonable times prior to the Closing Date ("Due Diligence Period") for the purposes of showing the property to prospective lenders, for the taking of measurements, or for making reasonable inspections of purpose. BUYER shall indemnify and hold SELLER harmless from all damages, costs, loss, and liability associated with said access. BUYER shall have the right to inspect and examine the Property to the extent BUYER deems necessary in its sole discretion, to determine the condition of the Property and the suitability of the Premises for its development. BUYER's

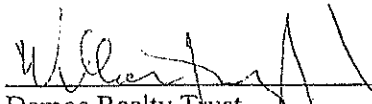
representatives, consultants, agents and employees shall, during regular business hours, (a) have the right to cause complete environmental reviews and site assessments and inspections of the Property to be made, (b) have access to all buildings, improvements, and (c) conduct all other necessary feasibility studies, title reports, surveys, soils tests, ground water tests, engineering studies, examination of zoning status, building and use permits, sign permits and all other permits required for the Property. While conducting such investigations, tests and studies, BUYER shall not unreasonably disturb or interfere the Property. Prior to the expiration of the Due Diligence Period, BUYER shall notify Seller if BUYER is not satisfied with such investigations and reviews and BUYER shall have the right, in its sole and absolute discretion, to terminate this Agreement and receive a refund of its Deposit, in which event, except as specifically provided otherwise in this Agreement, the parties shall have no further obligations to each other under this Agreement

35. Entire Agreement. This document shall constitute the entire agreement of the parties regarding the subject matter hereof. It may not be altered or amended except by a writing signed by the parties. This instrument, executed in triplicate, is to take effect as a sealed instrument, is binding upon and inures to the benefit of the parties hereto and their respective heirs, devisees, executors, administrators, successors and assigns, and may be canceled, modified or amended only by a written instrument executed by both the SELLER and the BUYER. If two or more persons are named herein as BUYER their obligations hereunder shall be joint and several.

36. Closing. The Closing shall occur upon notice to the Sellers by the Buyer on or within 180 from the receipt of all applicable and necessary permits for the construction of the affordable housing development of Buyer's design and the expiration of all appeal periods without appeal, including without limitation building permits issued by the Town of Pembroke.

SELLER:

BUYER


Demos Realty Trust
William J. Murphy, Jr., Trustee


River Marsh, LLC
Brian Murphy, its Manager

From: Brian Murphy [<mailto:brianmurphy@unicornrealty.com>]

Sent: Monday, July 24, 2017 10:58 AM

To: Michael Busby

Subject: River Marsh Revised

Hi Mike

Here is the revised application and plan for River Marsh in Pembroke.

We are down to 56 units and have moved off the knoll out toward the river as we discussed. Please let me know if you have any comments/ questions. I will mail out hard copies to your office and to the Pembroke ZBA.

Thanks,

Brian



Comprehensive Permit Site Approval Application/Homeownership

www.masshousing.com | www.masshousingrental.com

Comprehensive Permit Site Approval Application/Homeownership

Attached is the Massachusetts Housing Finance Agency ("MassHousing") application form for Project Eligibility/Site Approval ("Site Approval") under the state's comprehensive permit statute (M.G.L. c. 40B, Sections 20-23 enacted as Chapter 774 of the Acts of 1969) known as "Chapter 40B". Developers seeking a comprehensive permit to construct affordable housing under Chapter 40B and intending to use a MassHousing financing program or financing through the New England Fund ("NEF") program must receive Site Approval from MassHousing. This approval (also referred to as "project eligibility approval") is a required component of any comprehensive permit application to be submitted to the local Zoning Board of Appeals of the municipality in which the development is to be located.

As part of its review of your application, MassHousing will conduct an inspection of the site and will solicit comments from the relevant municipality. MassHousing will consider any relevant concerns that the municipality might have about the proposed project or the developer. The applicant is encouraged, therefore, to make contact with the municipality prior to submitting the Site Approval application in order to ensure that the applicant understands any concerns that the municipality may be likely to raise regarding the proposed development.

In order for a project to receive Site Approval, MassHousing must determine that (i) the applicant has sufficient legal control of the site; (ii) the applicant is a public agency, non-profit organization or limited dividend organization; and (iii) the applicant and the project are generally eligible under the requirements of the MassHousing program selected by the applicant, subject to final eligibility review and approval. Furthermore, MassHousing must determine that the site of the proposed project is generally appropriate for residential development (taking into consideration municipal actions previously taken to meet affordable housing needs) and that the conceptual project design is generally appropriate for the site. In order for MassHousing to be able to make these findings (required by 760 CMR 56.04 (4)), it is important that you answer all questions in the application and include all required attachments.

Please note that MassHousing requires that all applicants meet with a member of our 40B Department staff before submitting their application. Applications for any projects that have not been the subject of a required pre-application meeting will not be accepted or processed.

Upon completion of its analysis, MassHousing will either issue a Site Approval Letter that approves, conditionally approves or denies the application. If the application is approved, the applicant should apply to the Zoning Board of Appeals within two years from the date of the Site Approval Letter (unless MassHousing extends such term in writing).

Please note that Site Approval from MassHousing does not constitute a loan commitment by MassHousing or any other financing program. All potential MassHousing financing is subject to further review and underwriting by MassHousing's Rental Lending Department.

Please be sure you have familiarized yourself with all of the applicable requirements set forth in the Chapter 40B regulations and guidelines, which can be found at

www.mass.gov/hed/economic/eohed/dhcd/legal/regs/760-cmr-56.html and
www.mass.gov/hed/docs/dhcd/legal/comprehensivepermitguidelines.pdf

Instructions for completing the Site Approval Application are included in the application form, which is attached. The completed application form and all additional documentation should be sent, after your pre-application meeting has been held, to

Gregory Watson, Manager of Comprehensive Permit Programs
MassHousing, One Beacon Street, Boston, MA 02108

We look forward to working with you on your proposed development. Please contact Gregory Watson at 617-854-1880 or gwatson@masshousing.com to discuss scheduling your pre-application meeting or if there is any assistance that we can provide in the meantime to make your application process a smooth and efficient one.

Our Commitment to You

MassHousing recognizes that applicants seek some measure of predictability regarding the timeframe for our processing of their applications. Our staff will endeavor to adhere to the following schedule for reviewing applications for site approval:

Within two (2) business days of receipt of your application (provided that you have attended a required pre-application meeting) a member of our staff will notify you of any of the items listed on the checklist at the end of the application form that were missing from your application package. Please note that our acknowledgement of receipt of an item does not indicate that any substantive review has yet taken place.

If your application package is missing any of the items indicated on the checklist by an asterisk, we will not be able to continue processing your application until such items are received.

If we have received the information that is crucial to the commencement of our review process, we will proceed to (i) give the municipality a period of thirty (30) days in which to submit comments relating to your proposal; (ii) schedule and conduct a site visit; and (iii) solicit bids for and commission and review an "as is" appraisal of your site.

If during our review of your application package we determine that additional information or clarification is needed, we will notify you as soon as possible. Depending on when we receive such additional information, this may affect the amount of time required for MassHousing to complete the site approval process.

Assuming that your application package was complete and that you respond in a timely manner to requests for additional information or clarification, we would expect to issue or deny your site approval within 60 days of our receipt of your application package.



**Application for Chapter 40B Project Eligibility/Site Approval
for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects**

Please be sure to answer ALL questions. Indicate "N/A", "None" or "Same" when necessary.

Section 1: GENERAL INFORMATION (also see Required Attachments listed at end of Section 1)

Name of Proposed Project: River Marsh Village

Municipality: Pembroke

Address of Site: 274 Water St

Cross Street (if applicable): Church St (Route 139) is the closest cross St

Zip Code: 02359

Tax Parcel I.D. Number(s) (Map/Block/Lot): E15-17-A & E15-17

Name of Proposed Development Entity (typically a single purpose entity): River Marsh, LLC

Entity Type: Limited Dividend Organization ☒ Non-Profit* ☐ Government Agency ☐

** If the Proposed Development Entity is a Non-Profit, please contact MassHousing regarding additional documentation that must be submitted.*

Has this entity already been formed? Yes ☒ No ☐

Name of Applicant (typically the Proposed Development Entity or its controlling entity or individual):
River Marsh, LLC

Applicant's Web Address, if any: _____

Does the Applicant have an identity of interest with any other member of the development team or other party to the Proposed Project? Yes ☐ No ☒ If yes, please explain: _____

Primary Contact Information (required)

Name of Individual: Brian Murphy

Relationship to Applicant: Owner

Name of Company (if any): _____

Street Address: 293 Washington St

City/State/Zip: Norwell, MA 02061

Telephone (office and cell) and Email: (O) 781-659-2255 (C) 781-760-0682 brianmurphy@unicornrealty.com

Secondary Contact Information (required)

Name of Individual: Warren Baker

Relationship to Applicant: Attorney

Name of Company (if any): Baker, Braverman, & Barbadoro

Street Address: 300 Crown Colony Drive Ste 500

City/State/Zip: Quincy, MA 02169

Telephone (office and cell) and Email: (O) 781-848-9610 (C) 781-910-9610 warrenb@bbb-lawfirm.com

Additional Contact Information (optional)

Name of Individual: _____

Relationship to Applicant: _____

Name of Company (if any): _____

Street Address: _____

City/State/Zip: _____

Telephone (office and cell) and Email: _____

Anticipated Permanent Financing: MassHousing ☐ NEF Bank ☒

If NEF Bank, Name of Bank: South Shore Bank

Total Number of Units 56 # Affordable Units 14 # Market Rate Units 42

Age Restricted? Yes/No No If Yes, 55+ or 62+? _____

Brief Project Description (150 words or less): _____

The project proposes 56 townhouse condominiums on approximately 49 acres in Pembroke, MA off of Water St.

Required Attachments Relating to Section 1

1.1 Location Map

Provide a USGS or other form of map clearly marked to show the site's location, and an approximate property boundary.

1.2 Tax Map

Provide a copy of municipal tax map (assessor's plan) with subject parcels and parcel ID #'s clearly identified.

1.3 Directions

Provide detailed written directions to the site, noting the entrance to the site, relevant boundaries and any prominent landmarks that can be used for identification purposes.

**Application for Chapter 40B Project Eligibility/Site Approval
for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects**

Section 2: EXISTING CONDITIONS/SITE INFORMATION (also see Required Attachments listed at end of Section 2)

In order to issue Site Approval, MassHousing must find (as required by 760 CMR 56.04 (4)) that the site is generally appropriate for residential development.

Name of Proposed Project: River Marsh Village

Buildable Area Calculations	Sq. Feet/Acres (enter "0" if applicable—do not leave blank)
Total Site Area	2,175,386 sf / 49.94 ac
Wetland Area	1,368,085 sf / 31.40 ac
Flood/Hazard Area	1,532,018 sf / 35.17 ac
Endangered Species Habitat (animal and/or plant)	1,720,073 sf / 39.49 ac
Conservation/Article 97 Land	
Protected Agricultural Land	
Other Non-Buildable (Describe)	
Total Non-Buildable Area	1,368,085 sf / 31.40 ac wetlands
Total Buildable Site Area	807,301 sf / 18.54 ac

Current use of the site and prior use if known: Wooded undeveloped land and single family home.

Is the site located entirely within one municipality? Yes ☒ No ☐

If not, in what other municipality is the site located? _____

How much land is in each municipality? (the Existing Conditions Plan must show the municipal boundary lines) _____

Current zoning classification and principal permitted uses: Residence A - detached single family homes
Business B - offices, retail, businesses

Previous Development Efforts

Please list (on the following page) any previous applications pertaining to construction on or development of the site, including (i) type of application (comprehensive permit, subdivision, special permit, etc.); (ii) application filing date; (iii) date of denial, approval or withdrawal. Also indicate the current Applicant's role, if any, in the previous applications. Note that, pursuant to 760 CMR 56.03 (1), a decision of a Zoning Board of Appeals to deny a Comprehensive Permit, or (if the Statutory Minima defined at 760 CMR 56.03 (3) (b or c) have been satisfied) grant a Comprehensive Permit with conditions, shall be upheld if a related application has previously been received, as set forth in 760 CMR 56.03 (7).

To the best of your knowledge, has this site ever been rejected for project eligibility/site approval by another subsidizing agency or authority? No

Existing Utilities and Infrastructure	Yes/No	Description
Wastewater-private wastewater treatment	Yes	Proposed common septic system
Wastewater-public sewer	No	
Storm Sewer	No	
Water-public water	Yes	8" CI watermain- Town of Pembroke
Water-private well	No	
Natural Gas	Yes	Columbia Gas of Massachusetts
Electricity	Yes	National Grid / Eversource
Roadway Access to Site	Yes	Church Street to Water Street
Sidewalk Access to Site	No	
Other	N/A	

Describe surrounding land use(s): Residential parcels with colonial style wood framed structures.
Magoun Cemetery (Town of Pembroke)

Surrounding Land Use/Amenities	Distance from Site	Available by Public Transportation?
Shopping Facilities	.5 miles	10 minute walk
Schools	.5-4 Miles	Yes. Town School Bus
Government Offices	3 Mi	
Multi-Family Housing	1 mile	
Public Safety Facilities	3 miles	
Office/Industrial Uses	.5 miles	
Conservation Land	.25 mi	
Recreational Facilities	.5 mi	
Houses of Worship	.5-3 miles	
Other		

List any public transportation near the site, including type of transportation and distance from the site:

The GATRA bus line has a stop that picks up at the Stop & Shop/Kohls Plaza less than a half mile from the site.

The P&B bus line has a stop at Roche Brothers in Marshfield which is 2.5 miles down Route 139

The closest commuter rail stop is Hanson which is 8.4 miles away

Site Characteristics and Development Constraints

Please answer "Yes", "No" or "Unknown" to the following questions. If the answer is "Yes" please identify on Existing Conditions Plan as required for Attachment 2.1 and provide additional information and documentation as an attachment as instructed for Attachment 2.4., "Documentation Regarding Site Characteristics/Constraints".

Are there any easements, rights of way or other restrictions of record affecting the development of the site? No

Are there documented hazardous waste sites on or within a 1/2 mile radius of the site? No

Is there any evidence of underground storage tanks or releases of hazardous material, including hazardous waste, on the site or within close proximity to the site? No

Are there any above-ground storage containers with flammable or explosive petroleum products or chemicals on or within 1/2 mile of the site? Unknown - single family oil heating

Is the site, or any portion thereof, located within a designated flood hazard area? Yes

Does the site include areas designated by Natural Heritage as endangered species habitat? Yes

Are there documented state-designated wetlands on the site? Yes

Are there documented vernal pools on the site? Unknown

Is the site within a local, state or federal Historic District? No

Is the site or any building(s) on the site listed, nominated or eligible for listing on the National Register of Historic Places? No

Has the site or any building(s) on the site been designated as a local, state or national landmark? No

Are there existing buildings and structures on site? Yes - 1 single family home

Does the site include documented archeological resources? Unknown

Does the site include significant areas of ledge? No

Does the site include areas with slopes greater than 10%? No

If applying for MassHousing Financing, is any portion of the site considered "Prime" or "Unique" agricultural land under Executive Order 193? No

Required Attachments Relating to Section 2

2.1 Existing Conditions Plan

Please provide a detailed Existing Conditions Plan showing the entire site prepared, signed and stamped by a registered engineer or land surveyor. Plans should be prepared at a scale of 1"=100' or 1"=200' and should include the following information:

- a. Reduced scale locus map
- b. Surveyed property boundaries
- c. Topography (2' contours)
- d. Wetland boundaries (if applicable)
- e. Existing utilities (subsurface and above ground)
- f. Natural features including bodies of water, rock outcroppings
- g. Existing easements and/or rights of way on the property
- h. Existing buildings and structures, including walls, fences, wells
- i. Existing vegetated areas; specimen trees or those with caliper greater than 18" should be shown individually
- j. Existing site entries and egresses

Please provide two (2) sets of full size (30" x 40" plans) along with three (3) sets of 11" x 17" reproductions.

2.2 Aerial Photographs

Please provide one or more aerial photograph(s) of the site (such as those available online) showing the immediate surrounding area if available. Site boundaries and existing site entrance and access points must be clearly marked.

2.3 Site/Context Photographs

Please provide photographs of the site and surrounding physical and neighborhood context, including nearby buildings, significant natural features and land uses. Please identify the subject and location of all photographs.

2.4 Documentation Regarding Site Characteristics/Constraints

Please provide documentation of site characteristics and constraints as directed including narratives, summaries and relevant documentation including:

- Flood Insurance Rate Map (FIRM) showing site boundaries
- Wetlands delineation
- Historic District nomination(s)

2.5 By-Right Site Plan (if available)

MassHousing will commission, at your expense, an "as-is" appraisal of the site in accordance with the Guidelines, Section B (1). Therefore, if there is a conceptual development plan which would be permitted under current zoning and which you would like the appraiser to take into consideration, or if permits have been issued for alternative development proposals for the site, please provide two (2) copies of a "by-right" site plan showing the highest and best use of the site under current zoning, and copies of any existing permits. These will assist the appraiser in determining the "as is" value of the site without any consideration being given to its potential for development under Chapter 40B.

**Application for Chapter 40B Project Eligibility/Site Approval
for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects**

Section 3: PROJECT INFORMATION (also see Required Attachments listed at end of Section 3)

In order to issue Site Approval, MassHousing must find (as required by 760 CMR 56.04 (4)) that the proposed project appears generally eligible under the requirements of the housing subsidy program and that the conceptual project design is generally appropriate for the site.

Name of Proposed Project: River Marsh Village

Project Type (mark both if applicable): New Construction ☒ Rehabilitation ☐ Both ☐

Total Number of Dwelling Units: 56

Total Number of Affordable Units: 14

Unit Mix: Affordable Units

Unit Type	0 Bedroom	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom
Number of Units	0	0	8	9	0
Number of Bathrooms			2.5	2.5	
Square Feet/Unit			1900	2100	

Unit Mix: Market Rate

Unit Type	0 Bedroom	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom
Number of Units	0	0	15	36	0
Number of Bathrooms			2.5	2.5	
Square Feet/Unit			1900	2100	

Percentage of Units with 3 or More Bedrooms*: 66%

** Note that the January 17, 2014 Interagency Agreement Regarding Housing Opportunities for Families with Children requires that at least 10% of the units in the project must have three (3) or more bedrooms. Evidence of compliance with this requirement must be provided at Final Approval.*

Number of Handicapped Accessible Units: 0 Market Rate: 0 Affordable: 0

Gross Density (units per acre): 2.2

Net Density (units per buildable acre): 3.14

Residential Building Information

Building Type and Style (single-family detached, townhouse, multi-family)	Construction or Rehabilitation	Number of Stories	Height	GFA	Number Bldgs. of this type
Townhouse	Construction	1.5	30	2500	56

Non-Residential Building Information

Building Type and Style	Construction or Rehabilitation	Number of Stories	Height	GFA	Number Bldgs. of this type

Will all features and amenities available to market unit residents also be available to affordable unit residents?
 If not, explain the differences. Exteriors will all look the same for market and affordable. Affordable interiors will have formica instead of granite counters, carpet and tile instead of hardwood floors, and white appliances rather than stainless steel.

Parking

Total Parking Spaces Provided: 254

Ratio of Parking Spaces to Housing Units: 4.5

Lot Coverage (Estimate the percentage of the site used for the following)

Buildings: 5.4%

Parking and Paved Areas: 5%

Usable Open Space: 35.6%

Unusable Open Space: 64.4%

Lot Coverage: 11.5%

Does project fit definition of "Large Project" (as defined in 760 CMR 56.03 (6))? Yes/No No

Required Attachments Relating to Section 3

3.1 Preliminary Site Layout Plan(s)

Please provide preliminary site layout plans of the entire site prepared, signed and stamped by a registered architect or engineer. Plans should be prepared at a scale of 1"=100' or 1"=200', and should show

- Proposed site grading (2' contours)
- Existing lot lines
- Easements (existing and proposed)
- Access to a public way must be identified
- Required setbacks
- Proposed site circulation (entrances/egresses, roadways, driveways, parking areas, walk ways, paths, trails)
- Building and structure footprints (label)
- Utilities (existing and proposed)
- Open space areas
- Schematic landscaping and screening
- Wetland and other restricted area boundaries and buffer zones

Please provide two (2) sets of full size (30" x 40") plans along with three (3) sets of 11" x 17" reproductions.

3.2 Graphic Representations of Project/Preliminary Architectural Plans

- Typical floor plans
- Unit plans showing dimensions, bedrooms, bathrooms and overall unit layout
- Exterior elevations, sections, perspectives and illustrative rendering.

3.3 Narrative Description of Design Approach

Provide a narrative description of the approach to building massing, style and exterior materials; site layout; and the relationship of the project to adjacent properties, rights of way and existing development patterns. The handbook called Approach to Chapter 40B Design Reviews prepared by the Cecil Group in January 2011 may be helpful in demonstrating the nature of the discussion that MassHousing seeks in this narrative.

3.4 Tabular Zoning Analysis

Zoning analysis in tabular form comparing existing zoning requirements to the waivers that you will request from the Zoning Board of Appeals for the proposed project, showing required and proposed dimensional requirements including lot area; frontage; front, side and rear setbacks; maximum building coverage; maximum lot coverage; height; number of stories; maximum gross floor area ratio; units per acre; units per buildable acre; number of parking spaces per unit/square foot; and total number of parking spaces (proposed and required).

3.5 Completed Sustainable Development Principles Evaluation Assessment Form *(see attached form)*

All developments seeking Chapter 40B site approval must demonstrate consistency with the Commonwealth's May 2007 Sustainable Development Principles.

**Application for Chapter 40B Project Eligibility/Site Approval
for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects**

Section 4: SITE CONTROL (also see Required Attachments listed at end of Section 4)

In order to issue Site Approval, MassHousing must find (as required by 760 CRM 56.04 (4)) that the Applicant controls the site.

Name of Proposed Project: River Marsh Village

Describe current ownership status of the entire site as shown on the site layout plans (attach additional sheets as necessary if the site is comprised of multiple parcels governed by multiple deeds or agreements):

Owned (or ground leased) by Development Entity or Applicant ☐

Under Purchase and Sale Agreement ☒

Under Option Agreement ☐

Note: The Grantee/Buyer on each document must be either the Applicant or the Proposed Development Entity, or you must attach an explanation showing direct control of the Grantee/Buyer by the Applicant or the Proposed Development Entity.

Grantor/Seller: Red Castle, LLC and Demos Realty Trust

Grantee/Buyer: River Marsh, LLC

Grantee/Buyer is (check one):

Applicant ☒ Development Entity ☐ Managing General Partner of Development Entity ☐

General Partner of Development Entity ☐ Other (explain) _____

Are the Parties Related? Yes

For Deeds or Ground Leases

Date(s) of Deed(s) or Ground Lease(s): _____

Purchase Price: _____

For Purchase and Sale Agreements or Option Agreements

Date of Agreement: 9/1/2016

Expiration Date: 8/30/2021

If an extension has been granted, date of extension: _____

If an extension has been granted, new expiration date: _____

Purchase Price: 2,500,000.00

Will any easements or rights of way over other properties be required in order to develop the site as proposed?

Yes ☒ No ☐

If Yes, please describe current status of easement:

Owned (or ground leased) by Development Entity or Applicant Existing easements are part of both Demos and Red Castle properties

Under Purchase and Sale Agreement _____

Under Option Agreement _____

Note: The Grantee/Buyer on each document must be either the Applicant or the Proposed Development Entity, or you must attach an explanation showing direct control of the Grantee/Buyer by the Applicant or the Proposed Development Entity.

Grantor/Seller: Red Castle, LLC and Demos Realty Trust

Grantee/Buyer: River Marsh, LLC

Are the Parties Related? Yes

For Easements

Date(s) of Easement(s): _____

Purchase Price: _____

For Easement Purchase and Sale Agreements or Easement Option Agreements

Date of Agreement: _____

Expiration Date: _____

If an extension has been granted, date of extension: _____

If an extension has been granted, new expiration date: _____

Purchase Price: _____

Required Attachments Relating to Section 4

4.1 Evidence of Site Control *(required)*

Copies of all applicable, fully executed documents (deed, ground lease, purchase and sale agreement, option agreement, land disposition agreement) showing evidence of site control, including any required easements, along with copies of all amendments and extensions. Copies of all plans referenced in documents must be included.

Application for Chapter 40B Project Eligibility/Site Approval for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects

Section 5: FINANCIAL INFORMATION – Site Approval Application Homeownership 40B

In order to issue Site Approval, MassHousing must find (as required by 760 CMR 56.04 (4)) that an initial pro forma has been reviewed and that the Proposed Project appears financially feasible and consistent with the Chapter 40B Guidelines, and that the Proposed Project is fundable under the applicable program.

Name of Proposed Project: River Marsh Village

Initial Capital Budget (please enter "0" when no such sales/revenue or cost is anticipated)

Sales/Revenue

Market	<u>24,050,000</u>
Affordable	<u>2,450,000</u>
Identity of Interest (Market)	<u></u>
Other Income	<u></u>
Total Sales/Revenue	<u>26,500,000</u>

Pre-Permit Land Value, Reasonable Carrying Costs

Item	Budgeted
Site Acquisition: pre-permit land value (to be determined by MassHousing commissioned appraisal) plus reasonable carrying costs.	<u>1,130,000</u>

Costs

Item	Budgeted
------	----------

Acquisition Cost

Site Acquisition: pre-permit land value (to be determined by MassHousing Commissioned Appraisal) plus reasonable carrying costs	<u>1,130,000</u>
Subtotal – Acquisition Costs	<u>1,130,000</u>

Construction Costs – Residential Construction (Hard Costs)

Building Structure Costs	<u>11,791,500</u>
Hard Cost Contingency	<u>589,575</u>
Subtotal – Residential Construction (Hard Costs)	<u>12,381,075</u>

Costs

Item	Budgeted
Construction Costs – Site Work (Hard Costs)	
Earth Work	1,179,150
Utilities: On Site	331,650
Utilities: Off Site	
Roads and Walks	1,029,350
Site Improvement	60,000
Lawns and Planting	117,915
Geotechnical Condition	
Environmental Remediation	100,000
Demolition	
Unusual Site Conditions/Other Site Work	1,200,000
Subtotal – Site Work (Hard Costs)	4,018,065
Construction Costs – General Conditions, Builders Overhead and Profit (Hard Costs)	
General Conditions	707,490
Builder's Overhead	235,830
Builder's Profit	707,490
Subtotal – General Conditions Builder's Overhead and Profit (Hard Costs)	1,650,810
General Development Costs (Soft Costs)	
Appraisal and Marketing Study (not 40B "as is" appraisal)	4,500
Lottery	
Commissions/Advertising-Affordable	122,500
Commissions/Advertising-Market	1,027,500
Model Unit	75,000
Closing Costs (unit sales)	27,000
Real Estate Taxes (during construction)	125,000
Utility Usage (during construction)	10,000
Insurance (during construction)	168,000
Security (during construction)	
Inspecting Engineer	35,000
Fees to Others	
Construction Loan Interest	901,665
Fees to Construction Lender	
Architectural	150,000
Engineering	136,500
Survey, Permits, etc.	198,000
Clerk of the Works	200,000
Construction Manager	300,000

Item	Budgeted
General Development Costs (Soft Costs) – Continued	
Bond Premiums (<i>Payment/Performance/Lien Bond</i>)	
Legal	100,000
Title (<i>including title insurance</i>) and Recording	104,880
Accounting and Cost Certification (<i>incl. 40B</i>)	45,000
Relocation	
40B Site Approval Processing Fee	2,500
40B Technical Assistance/Mediation Fund Fee	3,580
40B Land Appraisal Cost (<i>as-is value</i>)	4,500
40B Final Approval Processing Fee	5,000
40B Subsidizing Agency Cost Certification Examination Fee	2,500
40B Monitoring Agent Fees	8,500
40B Surety Fees	50,000
Other Financing Fees	
Development Consultant	
Other Consultants (<i>describe</i>)	
Other Consultants (<i>describe</i>)	
Soft Cost Contingency	201,600
Other General Development (Soft) Costs	
Subtotal – General Development Costs (Soft Costs)	4,008,725
Developer Overhead	
Developer Overhead	112,000
Subtotal – Developer Overhead	112,000
Summary of Subtotals	
Sales/Revenue	26,500,000
Site Acquisition	1,130,000
Residential Construction	12,381,075
Site Work	4,018,065
Builder's Overhead, Profit and General Conditions	1,650,810
General Development Costs	4,008,725
Developer Overhead	112,000
Summary	
Total Sales/Revenue	26,500,000
Total Development Costs (TDC)	23,300,675
Profit (Loss) from Sales/Revenue	3,199,325
Percentage of Profit (Loss) Over the Total Development Costs	13.73%

Required Attachments Relating to Section 5

5.1 New England Fund Lender Letter of Interest *(required for projects with NEF financing)*

Please attach a Letter of Interest from a current Federal Home Loan Bank of Boston (FHLBB) member bank regarding financing for the proposed development. The letter of interest must include, at a minimum, the following:

- Identification of proposed borrower, and brief description of the bank's familiarity with the borrower;
- Brief description of the Proposed Project, including location, number of units, and type of building (townhouse, garden style, etc.);
- Confirmation that the bank is a current FHLBB member bank and that the bank will specifically use NEF funds for the proposed development.

NOTE: Binding Construction and Permanent Financing Commitments (or evidence of closed loans) will be required at the time you apply for Final Approval from MassHousing.

5.2 Market Sale Comparables *(required)*

Please provide a listing of market sales being achieved in properties comparable to the proposed project.

5.3 Market Study *(if available)*

MassHousing may require a market study at Final Approval for projects located in areas where the need or demand for the type of housing being proposed cannot be clearly demonstrated.

Application for Chapter 40B Project Eligibility/Site Approval for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects

Section 6: APPLICANT QUALIFICATIONS, ENTITY INFORMATION AND CERTIFICATION

In order to issue Site Approval, MassHousing must find (as required by 760 CRM 56.04 (4)) that the applicant is either a non-profit public agency or would be eligible to apply as a Limited Dividend Organization and meets the general eligibility standards of the program.

Name of Proposed Project: River Marsh Village

Development Team

Developer/Applicant: Brian Murphy River Marsh, LLC

Development Consultant (if any): _____

Attorney: Warren Baker

Architect: Axiom Architects

Contractor: Norwell Construction, LLC

Lottery Agent: Delphic Associates

Management Agent: _____

Other (specify): _____

Other (specify): _____

Role of Applicant in Current Proposal

Development Task	Developer/Applicant	Development Consultant (Identify)
Architecture and Engineering	River Marsh LLC	Axiom Architects and McKenzie Engineering
Local Permitting	River Marsh LLC	Warren Baker
Financing Package	River Marsh LLC	South Shore Bank
Construction Management	River Marsh LLC	TBD
Other	River Marsh LLC	TBD

Applicant's Ownership Entity Information

Please identify for each of (i) the Applicant and, if different (ii) the Proposed Development Entity, the following (collectively with the Applicant and the Proposed Development Entity, the "Applicant Entities"): the Managing Entities, Principals, Controlling Entities and Affiliates of each.

Note: For the purposes hereof, "Managing Entities" shall include all persons and entities (e.g., natural persons, corporations, partnerships, limited liability companies, etc., including beneficiaries of nominee trusts) who are managers of limited liability companies, general partners of limited partnerships, managing general partners of limited liability partnerships, directors and officers of corporations, trustees of trusts, and other similar persons and entities that have the power to manage and control the activities of the Applicant and/or Proposed Development Entity.

"Principal or Controlling Entities" shall include all persons and entities (e.g., natural persons, corporations, partnerships, limited liability companies, etc., including beneficiaries of nominee trusts) that shall have the right to

- (i) approve the terms and conditions of any proposed purchase, sale or mortgage;*
- (ii) approve the appointment of a property manager; and/or*
- (iii) approve managerial decisions other than a decision to liquidate, file for bankruptcy or incur additional indebtedness.*

Such rights may be exercisable either (i) directly as a result of such person's or entity's role within the Applicant or the Proposed Development Entity or the Managing Entities of either or (ii) indirectly through other entities that are included within the organizational structure of the Applicant and/or Proposed Development Entity and the Managing Entities of either.

In considering an application, MassHousing will presume that there is at least one Principal or Controlling Entity of the Applicant and of the Proposed Development Entity. Any person or persons who have purchased an interest for fair market value in the Applicant and/or Proposed Development Entity solely for investment purposes shall not be deemed a Principal or Controlling Entity.

"Affiliates" shall include all entities that are related to the subject organization by reason of common control, financial interdependence or other means.

Applicant

Name of Applicant: River Marsh, LLC

Entity Type (limited liability company, limited partnership, limited liability partnership, corporation, trust, etc.):
LLC

State in which registered/formed: MA

List all Managing Entities of Applicant (you must list at least one): Brian Murphy

List all Principals and Controlling Entities of Applicant and (unless the Managing Entity is an individual) its Managing Entities (use additional pages as necessary): Brian Murphy

List all Affiliates of Applicant and its Managing Entities (use additional pages as necessary):

Proposed Development EntityName of Proposed Development Entity: River Marsh, LLCEntity Type *(limited liability company, limited partnership, limited liability partnership, corporation, trust, etc.):*
LLCState in which registered/formed: MAList all Managing Entities of Proposed Development Entity *(you must list at least one):* _____Brian MurphyList all Principals and Controlling Entities of Proposed Development Entity and *(unless the Managing Entity is an individual)*
its Managing Entities *(use additional pages as necessary):* _____Brian MurphyList all Affiliates of Proposed Development Entity and its Managing Entities *(use additional pages as necessary):* _____**Applicant Entity 40B Experience**Please identify every Chapter 40B project in which the Applicant or any Applicant Entity (as defined above) has or had an interest. For each such project, state whether the construction has been completed and whether cost examination has been submitted *(use additional pages as necessary)*.

40B Project	Municipality	Number of Units/Type	Year Completed	Cost Cert Submitted?
Washington Woods	Norwell	40 For Sale Condos	Ongoing	No
White Barn Lane	Norwell	36 For Sale Condos	Ongoing	No
Simon Hill	Norwell	126 Apartments	Ongoing	No
Woodland Village	Hanover	200 Apartments	Ongoing	No
River Stone	Hingham	36 For Sale Condos	Ongoing	No

Certification

I hereby certify on behalf of the Applicant, *under pains and penalties of perjury*, that the information provided above for each of the Applicant Entities is, to the best of my knowledge, true and complete; and that each of the following questions has been answered correctly to the best of my knowledge and belief:

(Please attach a written explanation for all of the following questions that are answered with a "Yes". Explanations should be attached to this Section 6.)

Is there pending litigation with respect to any of the Applicant Entities? Yes ☐ No ☒

Are there any outstanding liens or judgments against any properties owned by any of the Applicant Entities? Yes ☐ No ☒

Have any of the Applicant Entities failed to comply with provisions of Massachusetts law related to taxes, reporting of employees and contractors, or withholding of child support? Yes ☐ No ☒

Have any of the Applicant Entities ever been the subject of a felony indictment or conviction? Yes ☐ No ☒

During the last 10 years, have any of the Applicant Entities ever been a defendant in a lawsuit involving fraud, gross negligence, misrepresentation, dishonesty, breach of fiduciary responsibility or bankruptcy? Yes ☐ No ☒

Have any of the Applicant Entities failed to carry out obligations in connection with a Comprehensive Permit issued pursuant to M.G.L. c. 40B and any regulations or guidelines promulgated thereunder (whether or not MassHousing is or was the Subsidizing Agency/Project Administrator) including, but not limited to, completion of a cost examination and return of any excess profits or distributions? Yes ☐ No ☒

Have any of the Applicant Entities ever been charged with a violation of state or federal fair housing requirements? Yes ☐ No ☒

Are any of the Applicant Entities not current on all existing obligations to the Commonwealth of Massachusetts, and any agency, authority or instrument thereof? Yes ☐ No ☒

I further certify that the information set forth set forth in this application (including attachments) is true, accurate and complete as of the date hereof to the best of my/our knowledge, information and belief. I further understand that MassHousing is relying on this information in processing the request for Site Approval in connection with the above-referenced project; and

I further certify that we have met with a representative of the 40B Department at MassHousing and understand the requirements for a) completing this application and b) the procedures if and when Site Approval is granted, including the requirement for (i) the use of the standard MassHousing Regulatory Agreement, (ii) submission to MassHousing, within one hundred eighty (180) days after substantial completion or, if later, within ninety (90) days of the date on which all units are sold, of a cost certification examined in accordance with AICPA attestation standards by an approved certified public accountant and (iii) the posting of surety for completion of the cost certification as a condition of Final Approval by MassHousing under Chapter 40B.

Signature: _____

Name: Brian Murphy for River Marsh, LLC

Title: Manager

Date: 11/30/2016

Required Attachments Relating to Section 6

6.1 Development Team Qualifications

Please attach resumes for principal team members (Applicant, consultant, attorney, architect, general contractor, management agent, lottery agent, etc.) and list of all relevant project experience for 1) the team as a whole and 2) individual team members. Particular attention should be given to demonstrating experience with (i) projects of a similar scale and complexity of site conditions, (ii) permitting an affordable housing development, (iii) design, and (iv) financing. The development team should demonstrate the ability to perform as proposed and to complete the project in a competent and timely manner, including the ability to pursue and carry out permitting, financing, marketing, design and construction.

(If the Applicant (or, if the Applicant is a single purpose entity, its parent developer entity) has received financing from MassHousing within the past five (5) years for a development of comparable size and complexity to the Proposed Project, no resume or list of project experience need be submitted for the Applicant or, as applicable, its parent developer entity. Information regarding the other team members still will be required.)

6.2 Applicant's Certification

Please attach any additional sheets and any written explanations for questions answered with "yes" as required for Certification.

**Application for Chapter 40B Project Eligibility/Site Approval
for MassHousing-Financed and New England Fund ("NEF") Homeownership Projects**

Section 7: NOTIFICATIONS AND FEES

Name of Proposed Project: River Marsh, LLC

Notice

Date(s) of meetings, if any, with municipal officials prior to submission of application to MassHousing: _____

Date copy of complete application sent to chief elected office of municipality: _____

Date notice of application sent to DHCD: _____

Fees *(all fees should be payable to MassHousing)*

MassHousing Application Processing Fee (\$2500):

2,500

Chapter 40B Technical Assistance/Mediation Fee

2,500

a. Base Fee:

(Limited Dividend Sponsor \$2500, Non-Profit or Public Agency Sponsor \$1,000)

b. Unit Fee *(all projects)* \$30 per Unit:

2,040

Total TA/Mediation Fee *(Base Fee plus Unit Fee)*:

3,580

Total Fees Due:

6080

Land Appraisal Cost

You will be required to pay for an "as-is" market value appraisal of the site to be commissioned by MassHousing. MassHousing will contact you once a quote has been received for the cost of the appraisal.

Required Attachments Relating to Section 7

- 7.1 Narrative describing any prior correspondence and/or meetings with municipal officials
- 7.2 Evidence (such as a certified mail receipt) that a copy of the complete application package was sent to the chief elected official of municipality (may be submitted after the application is submitted to MassHousing)
- 7.3 Copy of notice of application sent to DHCD
- 7.4 Check made payable to MassHousing for Processing Fee (\$2500)
- 7.5 Check made payable to MassHousing for Technical Assistance/Mediation Fee
- 7.6 W-9 (Taxpayer Identification Number)

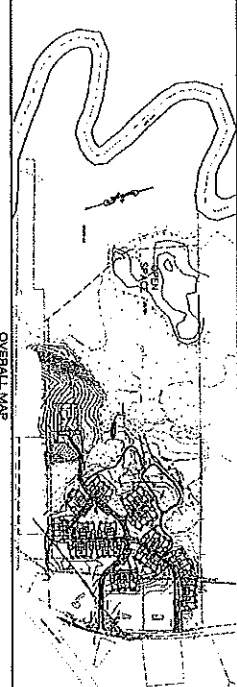
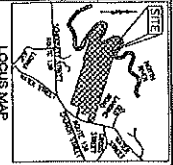
Application Checklist

The documentation listed below must, where applicable, accompany each application. For detailed descriptions of these required documents, please see the relevant sections of the application form.

* Applications missing any of the documents indicated by an asterisk will not be processed by MassHousing until MassHousing receives the missing item(s).

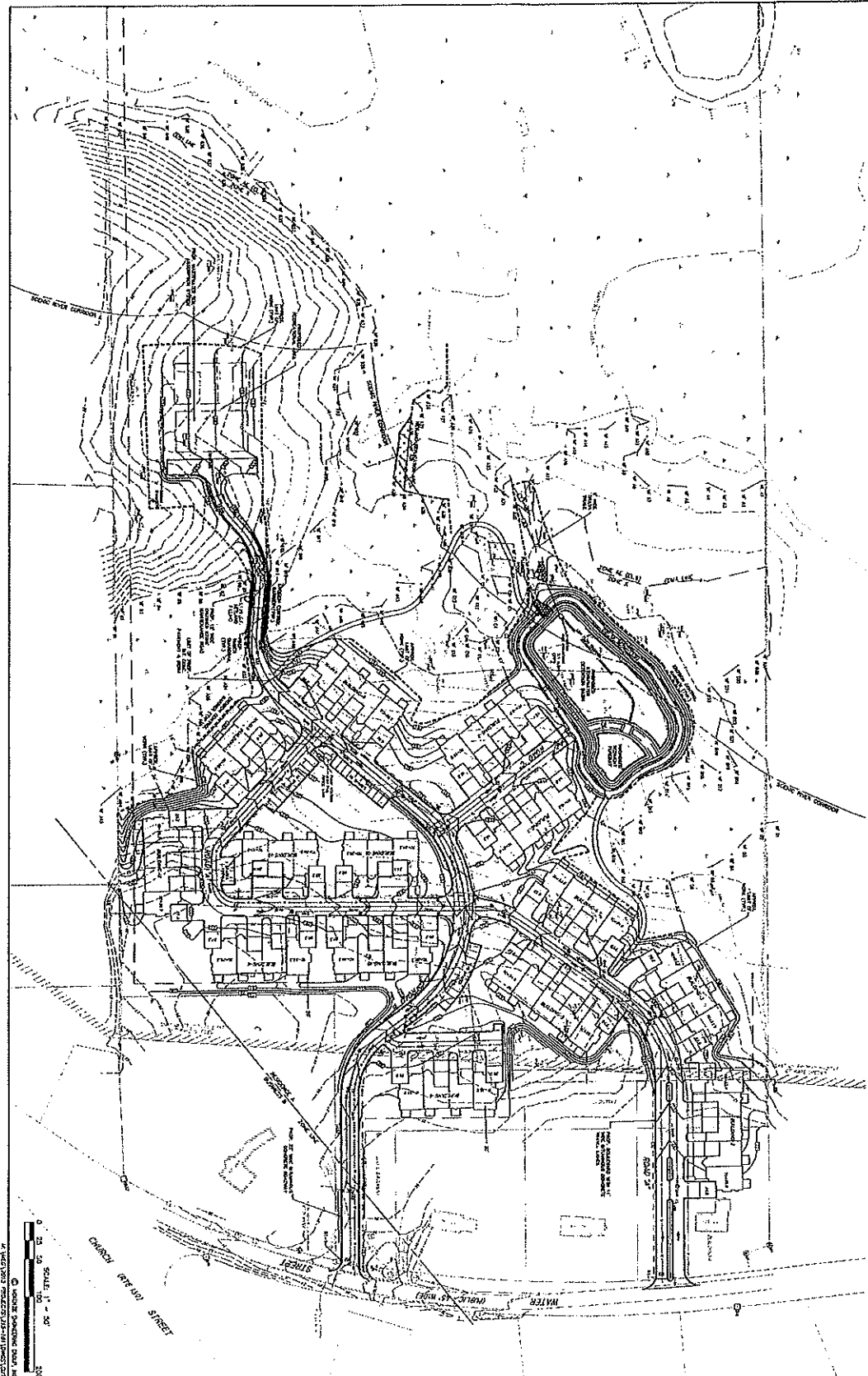
- ☐ * Completed application form, and certification under pains and penalties of perjury (*one (1) signed original accompanied by two (2) copies of the complete application package*)
- ☐ * Location Map
- ☐ Tax Map
- ☐ * Directions to the Proposed Site
- ☐ * Existing Conditions Plan
- ☐ Aerial Photographs
- ☐ Site/Context Photographs
- ☐ * Documentation Regarding Site Characteristics/Constraints
- ☐ * By Right Site Plan, if applicable
- ☐ * Preliminary Site Layout Plan(s)
- ☐ * Graphic Representations of Project/Preliminary Architectural Plans
- ☐ * Narrative Description of Design Approach
- ☐ * Tabular Zoning Analysis
- ☐ Sustainable Development Principles Evaluation Assessment Form
- ☐ * Evidence of Site Control (*documents and any plans referenced therein*)
- ☐ Land Disposition Agreement, if applicable
- ☐ * NEF Lender Letter of Interest
- ☐ Market Sales Comparables
- ☐ Market Study, if required by MassHousing
- ☐ * Development Team Qualifications
- ☐ Applicant's Certification (*any required additional sheets*)
- ☐ Narrative describing prior contact (*if any*) with municipal officials
- ☐ * Evidence that a copy of the application package has been received by the chief elected official in the municipality (*may follow after initial submission of application package, but site visit will not be scheduled nor request for municipal comments made until such evidence is received by MassHousing*)
- ☐ Copy of Notification Letter to DHCD
- ☐ * Fees (\$5,000 plus \$30 per unit of housing proposed) payable to MassHousing (*once an appraiser has been selected by MassHousing and an appraisal fee quoted, an additional non-refundable appraisal fee will be required*)

[ATTACH SUSTAINABLE DEVELOPMENT SCORECARD HERE]



BUILDING INDEX	
(1) 1-UNIT BUILDING	
(2) 2-UNIT BUILDING	
(3) 3-UNIT BUILDING	
(4) 4-UNIT BUILDING	
(5) 5-UNIT BUILDING	
(6) 6-UNIT BUILDING	
(7) 7-UNIT BUILDING	
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(99) 99-UNIT BUILDING	
(100) 100-UNIT BUILDING	

OPEN SPACE AND DENSITY CALCULATIONS	
TOTAL LAND AREA	43.34 AC
IMPROVED LAND AREA	22.53 AC
IMPROVED OPEN SPACE	11.81 AC
IMPROVED OPEN SPACE DENSITY	1.14 UNITS/AC



OWNER: River Marsh, LLC
293N Washington Street
Norwell, Massachusetts 02061

DATE: 1/17/2017
SCALE: 1" = 50'

PROJECT: RIVER MARSH VILLAGE
SITE PLAN

PERMIT PLAN SET

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**
(ASSESSORS MAP E-17, LOT 0 AND E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

REV	DATE	DESCRIPTION
1	1/17/2017	ISSUED FOR PERMITTING
2	1/17/2017	ISSUED FOR PERMITTING
3	1/17/2017	ISSUED FOR PERMITTING
4	1/17/2017	ISSUED FOR PERMITTING
5	1/17/2017	ISSUED FOR PERMITTING
6	1/17/2017	ISSUED FOR PERMITTING
7	1/17/2017	ISSUED FOR PERMITTING
8	1/17/2017	ISSUED FOR PERMITTING
9	1/17/2017	ISSUED FOR PERMITTING
10	1/17/2017	ISSUED FOR PERMITTING
11	1/17/2017	ISSUED FOR PERMITTING
12	1/17/2017	ISSUED FOR PERMITTING
13	1/17/2017	ISSUED FOR PERMITTING
14	1/17/2017	ISSUED FOR PERMITTING
15	1/17/2017	ISSUED FOR PERMITTING
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100	1/17/2017	ISSUED FOR PERMITTING

River Marsh, LLC

December 30, 2016

Mr. Gregory Watson
Manager of the Comprehensive Permit Program
MassHousing
One Beacon Street
Boston, MA 02108

**RE: RIVER MARSH, LLC
PEMBROKE, MASSACHUSETTS
MASSHOUSING HOUSING STARTS APPLICATION
DEVELOPMENT NARRATIVE**

Dear Mr. Watson:

River Marsh, LLC, of Pembroke, Massachusetts, hereby submits an application for a 'Site Eligibility Letter' to be issued by MassHousing for a development to be known as River Marsh Village. We met with Michael Busby on December 7, 2016 to review and get initial feedback.

The Developers have created the entity known as River Marsh, LLC for the sole purpose of developing River Marsh, a multi-family housing development in accordance with M.G.L 40B, §20-23. This entity shall execute a Regulatory Agreement to be entered into by and between itself, the community, and the lender, thereby creating a "Limited Dividend Organization".

The Town of Pembroke is a South Shore suburban community with a mostly residential character. It is bordered by Norwell to the North, Hanover and Hanson to the West, Duxbury and Marshfield to the East, and Kingston to the South. Pembroke is in a convenient location at approximately 10 miles East of Brockton, 15 miles North of Plymouth, and 30 Miles South of Boston.

The total land area is 23.5 square miles with a population of 17,837. According to the Department of Housing and Community Development's 2014 Ch 40B subsidized Housing Inventory, the Town of Pembroke has 6,447 year round housing units, with 625 units included in its subsidized Housing Inventory for a total of 9.6% of its housing stock.

Existing Site Conditions

This project consists of approximately 49.94 acres of land and has frontage on Water Street in Pembroke. The development will be comprised of two parcels which are shown on the

Assessor's map E15 lot 17 and map E15 lot 17A. The site is surrounded by developed residential lots on Water Street to the South, East and West, and the North River to the North.

The site is located within the Residence District A zoning district and is comprised of 18.54 acres of upland and 31.4 acres of wetland area. A single family colonial style home is located on parcel E15-17A whereas parcel E15-17 is undeveloped land. The undeveloped land consists of wooded and grassed areas with a relatively flat topography.

Proposed Project

The proposed development will consist of 68 non-age restricted condominium units comprised of 3, 4 and 5 unit buildings with bituminous concrete access driveways and associated infrastructure. Visitor and guest parking will be dispersed throughout the site. Access to the site will be provided by two access points from Water Street.

The condominiums will be designed to range in square footage from 1,500 to 2,100 square feet. The design will blend with the neighborhood and the town of Pembroke as a whole.

The project will access the utility infrastructure located on Water Street, including water, electric, telephone, gas and cable television. A wastewater treatment plant will be constructed to manage sewerage flows on-site. The stormwater management system will be designed to fully comply with all the standards of the Department of Environmental Protection's Stormwater Management Policy.

Affordability Component

We are proposing that twenty five (25%) percent, or nine units, will be identified as affordable units and will blend with the proposed market rate homes and will be evenly distributed throughout the development.

The affordable homes will be marketed to households whose income does not exceed eighty (80%) percent of the area median income, as defined by the Department of Housing and Urban Development.

The sale price for the affordable homes shall be calculated assuming a down payment five (5%) percent of the approved sales price with a total payment for principal, interest, mortgage insurance premiums, property taxes, property insurance and condominium association fees, if any, not to exceed thirty (30%) percent, of a household whose income is seventy (70%) percent of the area median income. Using the above formula and based on the more recent median income as published by HUD, the exact sales prices for the affordable units is to be determined.

It is hopeful that a permit can be issued by the local Zoning Board of Appeals, whereby residents of Pembroke will receive a preference for up to seventy (70%) percent of the affordable units (70% of 9 units is 6). Preference can be determined, regulated and coordinated by the Developer, monitoring agent and the community to include existing local residents, siblings, parents, and offspring of local residents, in addition to municipal workers.

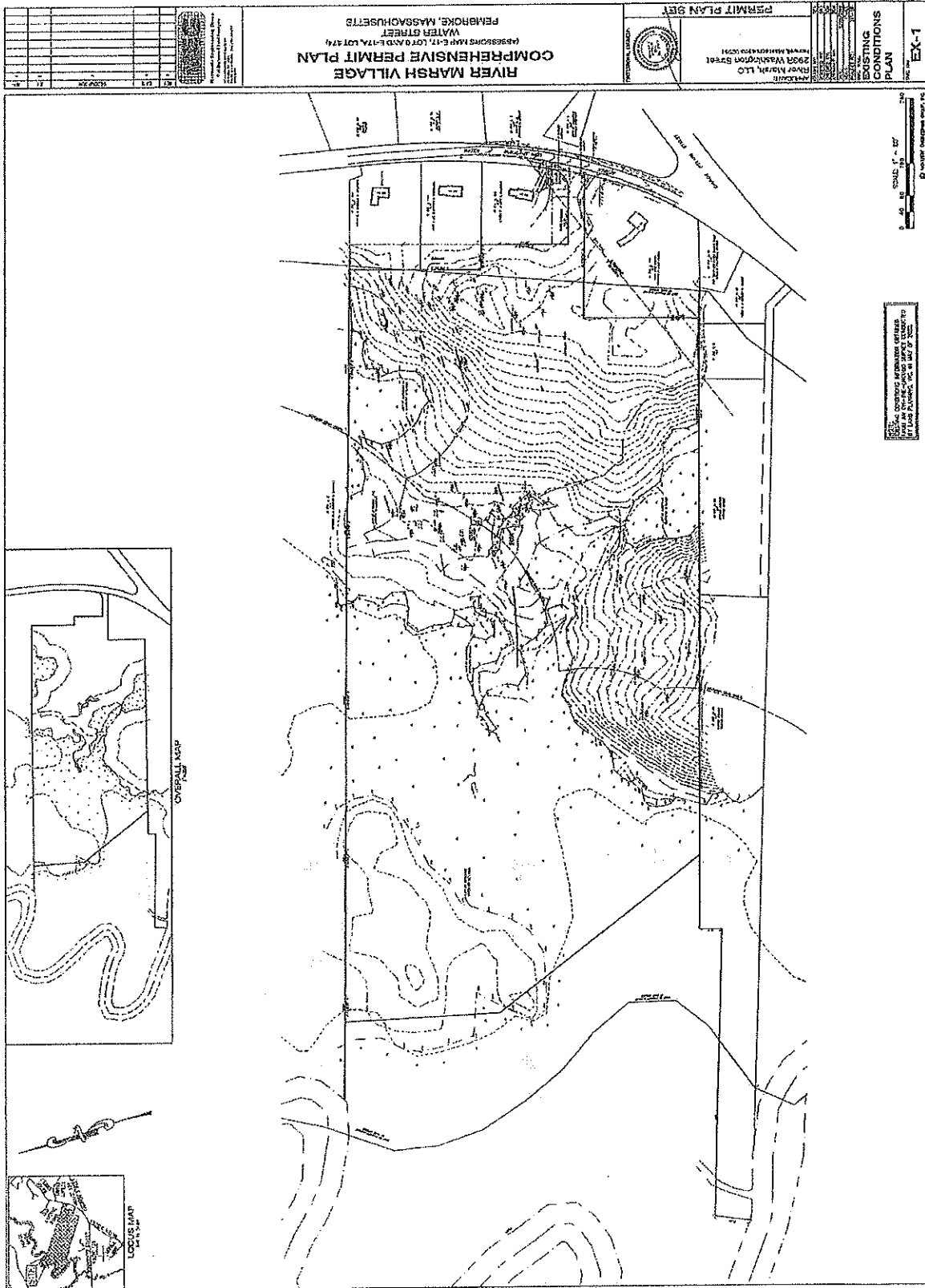
The Applicant will conduct and also be responsible for the cost related to the marketing/lottery of the affordable units.

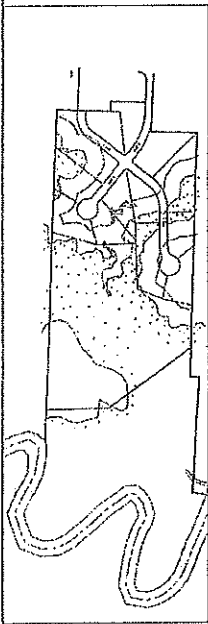
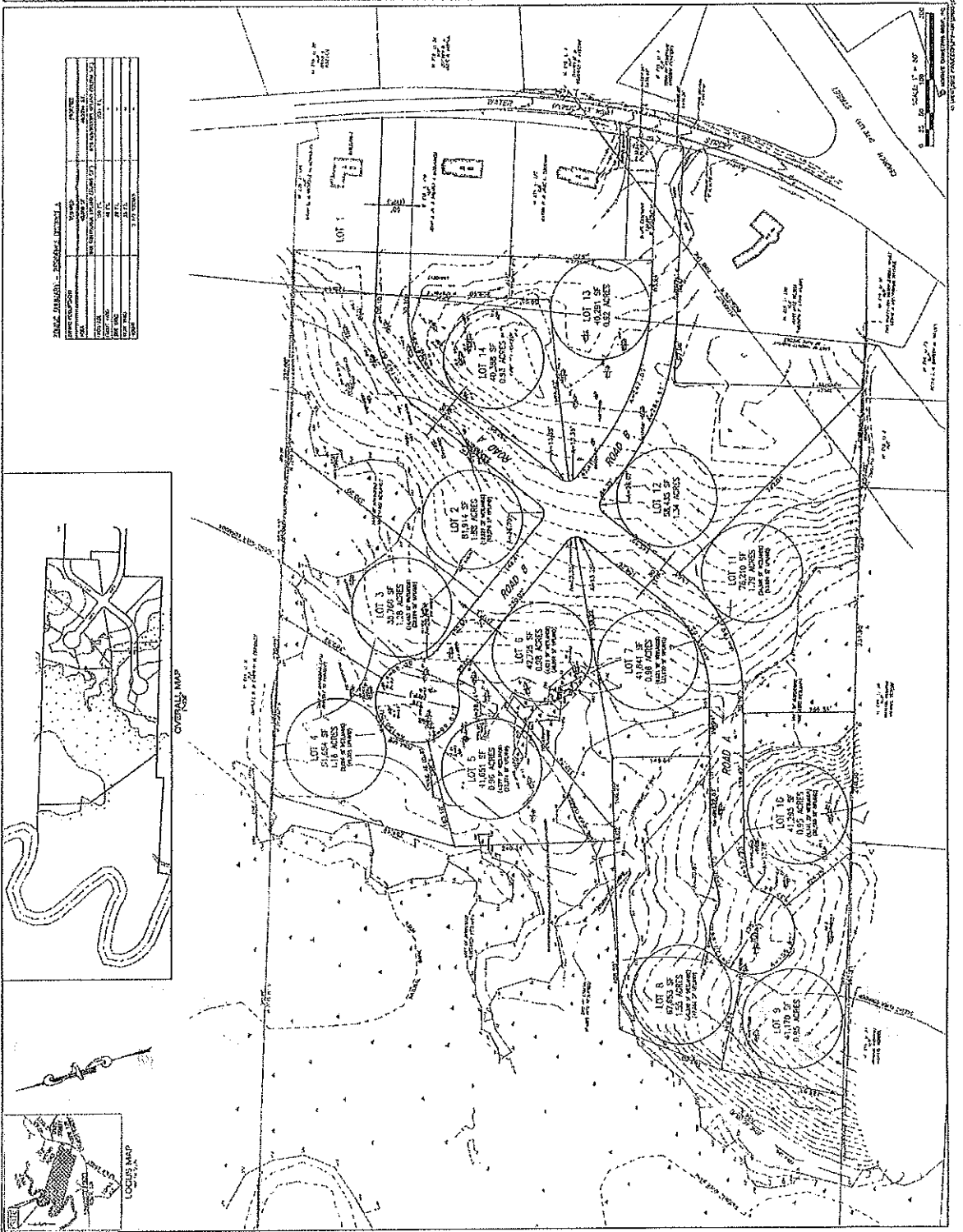
Thank you for your time in reviewing this application.

Sincerely,

A handwritten signature in black ink, appearing to read 'BPM', is written over the printed name.

Brian P. Murphy, Manager
River Marsh, LLC



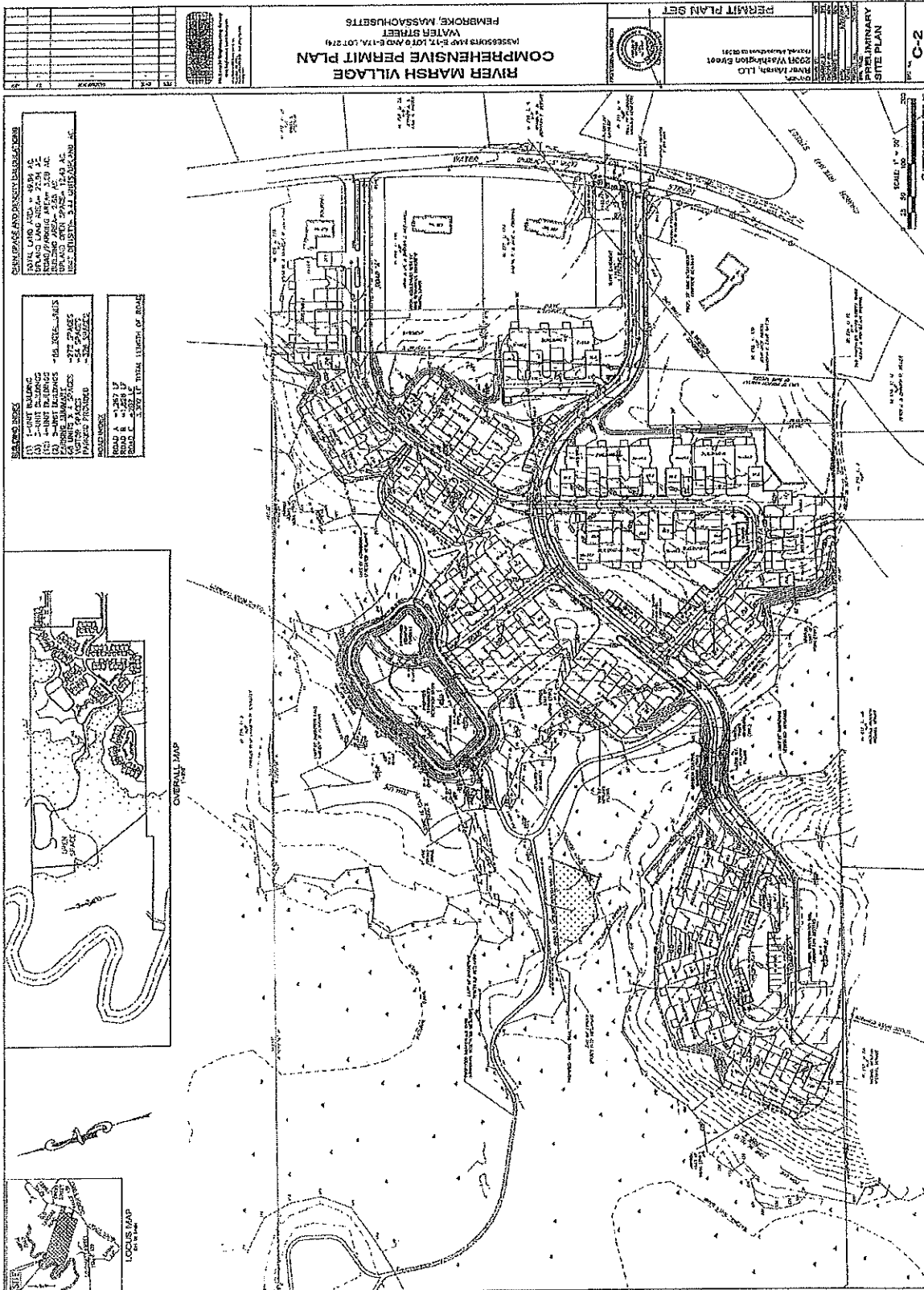


PRELIMINARY
SITE PLAN

10013 001244
071 '4

EXERCISE PLAN SET

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**
MAP E-17, LOT 8 AND E-17A, LOT 27D
WATER STREET
PEMBROKE, MASSACHUSETTS



RIVER MARSH, LLC

November 30, 2016

Ms. Jane Chrystal Kornegay
Undersecretary Housing and Community Development
Department of Housing and Community Development
100 Cambridge Street, Suite 300
Boston, MA 02114

RE: COMPREHENSIVE PERMIT APPLICATION
RIVER MARSH, LLC
PEMBROKE, MASSACHUSETTS
PROJECT ELIGIBILITY LETTER

Dear Ms. Kornegay:

The purpose of this letter is to advise you that River Marsh, LLC is proposing a 68 unit apartment complex through M.G.L. 40B, §20-23 in the Town of Pembroke.

We have submitted an application for a site eligibility letter to MassHousing and, in accordance with 760 CMR §31.01(2)(a), we are hereby notifying the Department of Housing and Community Development of our request for a project eligibility letter through the Housing Starts program. Please find a copy of the application enclosed.

In addition, a copy is being forwarded to the Town of Pembroke Board of Selectmen.

If you have any questions, please contact me through phone (781-659-2255) or email brianmurphy@unicornrealty.com.

Sincerely,



Brian P. Murphy
River Marsh, LLC
Managing Member

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: LISTING OF REQUESTED EXCEPTION AND WAIVERS

In accordance with the Town of Pembroke Rules and Regulations for Comprehensive Permits, a list of requested exceptions to local requirements, codes, bylaws, and regulations is provided herein.

Other Exemptions

In addition, pursuant to M.G.L. Chapter 40B and the regulations promulgated thereunder, the Project shall be exempt from all provisions of all other local by-laws, including without limitation, the following:

1. The Project shall be exempt from all provisions of the Pembroke Wetland Protection By-Law Article 22 of the General By-Laws and associated Rules and Regulations
2. The Project shall be exempt from all provisions of the Pembroke Board of Health Rules and Regulations.
3. The Project shall be exempt from all provisions of the Pembroke Planning Boards Rules and Regulations adopted under the Subdivision Control Law.
4. The Project shall be exempt from the filing fee requirements established by the Zoning Boards of Appeals, Planning Boards, Conservation Commission, or other Town entities, except for fees specifically relating to Comprehensive Permit Applications.
5. The Project shall be exempt from any other applicable zoning or related municipal ordinances so far as the same may be at variance with the Project or the Site Development Plans or the Architectural Plans as filed.

In addition to the foregoing exceptions, the Applicant hereby requests that all exceptions from, and permits under, the Pembroke Zoning Bylaws and all other applicable bylaws, regulations, and local requirements of the Town of Pembroke be granted pursuant to its application, as may be necessary so that the Project can be built in accordance with submitted plans.

River Marsh Village

Water Street, Pembroke, MA

List of Waivers (8/29/18)

Pursuant to M.G.L. Ch. 40B and regulations adopted pursuant thereto the following use, dimensional and other local requirements or regulations shall be waived for the project and other such waivers necessary to construct the project as permitted. Without the requested waivers, the Project could not be constructed. Following please find a table of the waivers necessary to permit the proposed project.

I. Pembroke Zoning Bylaw

Criteria	Requirement	Proposed
Multi-Unit Developments	Prohibited Use in Residence District A	
Section IV-1 D Residence District A		
Dimensional Regulations		
Lot Area	Residence A: 40,000 (s.f.) (80% contiguous upland)	Unchanged
Lot Frontage	Residence A: 150 (ft.)	Unchanged
Max Height	Residence A: 2.5 stories	2 stories
F.Y. Setback	Residence A: 40 (ft.)	40 ft.
S.Y. Setback	Residence A: 20 (ft.)	17.0 ft. (Building 11)
R.Y. Setback	Residence A: 25 (ft.)	>100'.
FAR	Not specified	
Building Coverage	Not specified	
Max Lot Coverage	Not specified	
Open Space	Not specified	

Section IV-2-B Residential - Commercial District - Multiunit Dwellings	Site Plan Approval by Planning Board	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.
Section IV-2-B Residential - Commercial District - Multiunit Dwellings	3. Multiunit Dwellings Conditions (a thru c) Special Permit ____	Multiunit Dwellings
IV-B.3. # of Dwellings	4 dwellings per acre	2.61 dwellings per acre
IV-D.1. Lot Sizes	120,000 sf of area (upland). Multiple unit dwellings are limited to no more than 1 dwelling unit per 10,000 sf of lot area (upland).	N/A
IV-D.2. Frontage	250 contiguous feet at the way line, 20 ft of frontage per unit	N/A
IV-D.3. Minimum Lot Perimeter Ratio	Greater than 35	230'
IV-D.4. Front Yards	100 ft from the front lot line	19'
IV-D.5. Side Yards	40 ft of the side lot lines, except abutting a residential use or district shall have 100' side yards on the sides abutting the residential use or district	17'
IV-D.6. Rear Yards	50 ft of the rear lot lines, except abutting a residential use or district shall have 100' rear yards on the sides abutting the residential use or district.	>100'
IV-D.7. Lot Width	170 ft	N/A
IV-D.8. Corner Clearances	No building, no structure, no fence other than a post and rail fence, no sign, and no foliage shall be maintained between a height of 2' and a height of 8' above the plane through the curb grades of intersecting ways within the area formed by the lines of intersecting ways and lines parallel to and 30' in distance from the intersecting way lines, or, in the case of a rounded corner, within an area which is 30' or less in distance from both way lines.	Nothing
IV-D.9. Projections	Nothing herein shall prevent the projection of steps or stoops not exceeding 30' in area, eaves, cornices, windowsills, or belt courses into any required yard	<30'
IV-D.10. Heights	2.5 stories	2 stories

IV-D.11. Driveways	Driveways providing a means of access for each individual lot shall not exceed 1' in width for each 10' of frontage	N/A
IV-D.12. Building Floor Area	Shall not exceed 35% of the total site area	5.3%
IV-D.13. Coverage	Shall not exceed 60% of the total site area	9.7%
IV-D.14. Landscaping	40% of any required yard shall be landscaped or left in a natural state. 50% of any yard or buffer strip abutting residential use or district shall be landscaped or left in a natural state.	<40% <50%
IV-D.15. Buffer Strips	Along any lot line abutting a residential use or district, there shall be planted a dense natural hedge greater than 6 feet in height and located within 10 feet of said lot line. Not specified	
Section V-4 Off Street Parking Access & Loading Requirements	2 parking spaces per dwelling unit	4 spaces per dwelling with 34 guest spaces = 258 spaces
Section V-7 Site Plan Approval	A. Purpose B. When Required C. Preliminary Submission D. Formal Submission E. Standard for Review F. Procedure G. Enforcement	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.

Other Exemptions

In addition, pursuant to M.G.L. Chapter 40B, Section 20-23 and the regulations promulgated thereunder, the Project shall be exempt from all provisions of all other local by-laws, including, without limitation, the following:

II. Pembroke Stormwater Management By-law Article XXXV of the General By-Laws and associated Rules and Regulations.

The project's design will be reviewed and approved by the Conservation Commission in accordance with the Mass. Wetlands Protection Act (MGL Ch. 131 s.40) and its Regulations (310 CMR 10.00) and the Mass. Stormwater Handbook and Standards. Without the requested waivers, the Project could not be constructed. Following please find a table of the waivers necessary to permit the proposed project:

Criteria	Requirement	Proposed
Section 6 – Construction Site Runoff	Sections A thru C	Waiver of this requirement.
	D. <u>Erosion and Sediment Control Plan</u> <u>Compliance with Commission Regulations</u> Entire Section	Waiver of this requirement.
	<u>Compliance with Planning Board Regulations</u> Entire Section —	Waiver of this requirement.
	F. <u>Surety</u> – Entire Section	Waiver of this requirement.
	G. <u>Final Report</u> – Entire Section	Waiver of this requirement.
Section 7 – Post-Construction Site Runoff	Sections A thru C	Waiver of this requirement.
	E. <u>Operations and Maintenance (O&M) Plans</u> <u>Compliance with Commission Regulations</u> Entire Section	Waiver of requirement.
	<u>Compliance with Planning Board Regulations</u> Entire Section	Waiver of requirement.

	<u>Surety - Entire Section</u>	Waiver of requirement.
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III. Pembroke Wetland Protection By-Law Article XXXVI of the General By-Laws and associated Rules and Regulations.

The project's design will be reviewed and approved by the Conservation Commission in accordance with the Mass. Wetlands Protection Act (MGL Ch. 131 s.40) and its Regulations (310 CMR 10.00). Without the requested waivers, the Project could not be constructed. Following please find a table of the waivers necessary to permit the proposed project:

Criteria	Requirement	Proposed
Article 3 – Application for Permit and Request for Determination	A. Application for Permit. "No person shall remove, fill, dredge, alter or build upon or within 200 feet of a riverfront area along most perennial streams or within 100 feet of any bank, fresh water wetland, coastal wetland, beach, dune flat, marsh, meadow, bog, swamp or upon or within 100 feet of any estuary, creek, river, stream, pond or lake, or within 100 feet of any land under said waters or upon or within 100 feet of any land subject to tidal action, coastal storm flowage, flooding or inundation,, or within 100 feet of the 100-year storm line,..."	Within 100 feet of an inland bank and of Bordering Vegetated Wetland (BVW) for the construction of a portion of Roadway A & B, Buildings 3, 4, 7, 9, 12, 13, open bottom arch culvert with headwalls, detention basin, drainage structures, and underground utilities.
		Within 100 feet of the 100-year storm line for the construction of the detention basin and drainage structures.
		Alteration to approximately 609 square feet of BVW and 37 linear feet of inland bank for the construction of a 12-foot-wide crushed stone maintenance road, and an

—	D. Filing Fee	open bottom arch culvert with headwalls.
Article 5 – Permit and Conditions	<p>B. The Commission is empowered to deny a permit for failure to meet the requirements of this chapter, for failure to submit necessary information and plans requested by the Commission, for failure to meet the design specifications, performance standards, and other requirements or regulations of the Commission, for failure to avoid or prevent unacceptable significant or cumulative effects upon the wetland values protected by this chapter and where no conditions are adequate to protect those values.</p> <p>C. "...These adverse impacts from construction and use can include, but <u>not</u> be limited to, erosion, siltation, loss of groundwater recharge, poor water quality, and loss of wildlife habitat. The Commission therefore may require that the applicant maintain a strip of continuous, undisturbed vegetative cover within the aforementioned 100 foot or 200-foot area, unless the applicant convinces the Commission that the area or part of it may be disturbed without harm to the values protected by this chapter..."</p>	<p>Waiver of required fees.</p> <p>Waiver of this requirement.</p> <p>Waiver of this requirement.</p>
Article 8 - Security	<p>The Commission may require as a permit condition that one or both of the following methods secure the performance and observance of other conditions:</p> <p>a. By bond or deposit or money or negotiable securities in an amount determined by the Commission to be sufficient and payable to the Town and separate from any other bond.</p> <p>b. By Conservation restriction, easement or other covenant running with the land, executed and properly recorded or registered in the case of registered land.</p>	Waiver if this requirement.

Article 9 – Burden of Proof	The applicant shall have the burden of providing by a preponderance of the credible evidence that the work proposed in the application will not harm the interests protected by this By-Law. Failure to provide adequate evidence shall be sufficient cause for the Commission to deny a permit or grant a permit with conditions or in the Commission's discretion to continue the hearing to another date to enable the applicant or others to present additional evidence.	Waiver of this requirement.
Article 10 – Relationship to Wetlands Protection Act	"... It is the intention of this bylaw that the purposes, jurisdiction, authority, exemptions, regulations, specifications, standards, and other requirements shall be interpreted and administered as stricter than those under the Wetlands Protection Act and regulations." —	Waiver of this requirement.

IV. Title V Rules and Regulations Exclusive to Pembroke, MA

The project's design will be reviewed and approved by the Board of Health in accordance with the Mass. DEP Environmental Code Title 5 (310 CMR 15.00). Without the requested waivers, the Project could not be constructed. Following please find a table of the waivers necessary to permit the proposed project.

Criteria	Requirement	Proposed
15.203 – System Sewage Flow Design Criteria	Family Dwelling, multiple per bedroom – 150 GPD	As allowed in Title V: 110 GPD per bedroom
15.232 Distribution Boxes	(3) (c) "...There shall be at least two more outlets than the required number to feed each distribution line individually."	As allowed in Title V: There shall be at least one outlet for each effluent distribution line.
15.247 Aggregate	(2) A minimum of a three-inch layer of double washed stone ranging from 1/8 to 1/2 inch diameter and free from iron, fines and dust in place shall cover the base aggregate to prevent intrusion of fine textured soils to the system.	As allowed in Title V: A minimum of a two-inch layer of double washed stone ranging from 1/8 to 1/2 inch.

15.252 Trenches	(4) The area between the trenches shall not be designated as system reserve area. A reserve area must be sufficient to replace the capacity of the original leaching area must be provided.” (7) Minimum diameter of each distribution line shall be four inches	As allowed in Title V: Area between trenches can be used for reserve area. As allowed in Title V: Minimum diameter of each distribution line shall be three inches.
15.253 – Pits, Galleries, or Chambers	(1) (b) Surrounding Aggregate – 6-inch minimum below unit	As allowed in Title V: No aggregate required below unit.
BOARD OF HEALTH REGULATION – 90-06-04	“...adopts the following fee schedule for Disposal Works Permit and Septic Plan Review...”	Waiver of required fees.
BOARD OF HEALTH REGULATION – 88-01-12 Septic System requirements for Multi-Unit Developments —	Entire section	Waiver of these requirements. Septic System to be permitted under Mass. DEP Environmental Code Title 5 (310 CMR 15.00) or the Mass. DEP Groundwater Discharge Permit (314 CMR 5.13).

IV. Pembroke Planning Board Rules and Regulations Governing the Issuance of Site Plan Approval

Criteria	Requirement	Proposed
Section I – Purpose & Authority	Entire Section	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.
Section II – Application	Entire Section —	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.

Section III. – Procedures	Entire Section	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.
Section IV – Site Plan Content	Entire Section	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.
Section V - Requirements	Entire Section	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.
Section VI – Development Impact Statement	Entire Section	Plan review by Zoning Board of Appeals consistent with M.G.L. 40B and regulations thereunder.

V. The Project shall be exempt from the filing fee requirements established by the Zoning Board of Appeals, Planning Board, Conservation Commission, or other Town entity, except for fees specifically relating to Comprehensive Permit Applications.

VI. The Project shall be exempt from any other applicable zoning or related municipal ordinances so far as the same may be at variance with the Project or the Site Development Plans or the Architectural Plans as filed.

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE. FILING FEE

In accordance with Town of Pembroke Rules and Regulations for Comprehensive Permits, a filing fee in the amount of \$3,800 has been provided by separate attachment, and such filing fee is incorporated into and made part of this application.

The filing fee is calculated as follows: $56 \text{ units} \times \$50 = \$2,800 + \$1,000 = \$3,800$

RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION
TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

RE: DEVELOPMENT TEAM

The following is a list of the River Marsh development team members:

Developer	River Marsh LLC Brian Murphy, Manager 293R Washington Street Norwell, MA 02061 (781) 659-2255
Contract/Builder	W.J. Murphy Construction Co., Inc. Brian Murphy, Manager 293R Washington Street Norwell, MA 02061 (781) 659-2255
Architect	Axiom Architects, Inc. Jim Kelleher 2048 Washington Street #12 Hanover, MA 02339 (781) 871-2101
Engineer	McKenzie Engineering, Inc. Brad McKenzie 150 Longwater Drive Norwell, MA 02061 (781) 792-3906

Marketing Agent
Affordable Units

To be Determined

Marketing Agent
Market Rate Units

To be Determined

Consultant

Baker, Braverman & Barbadoro, P.C.
Warren Baker, Esq. and Kim Kroha, Esq.
300 Crown Colony Drive, Suite 500
Quincy, MA 02169-0904
(781) 848-9610

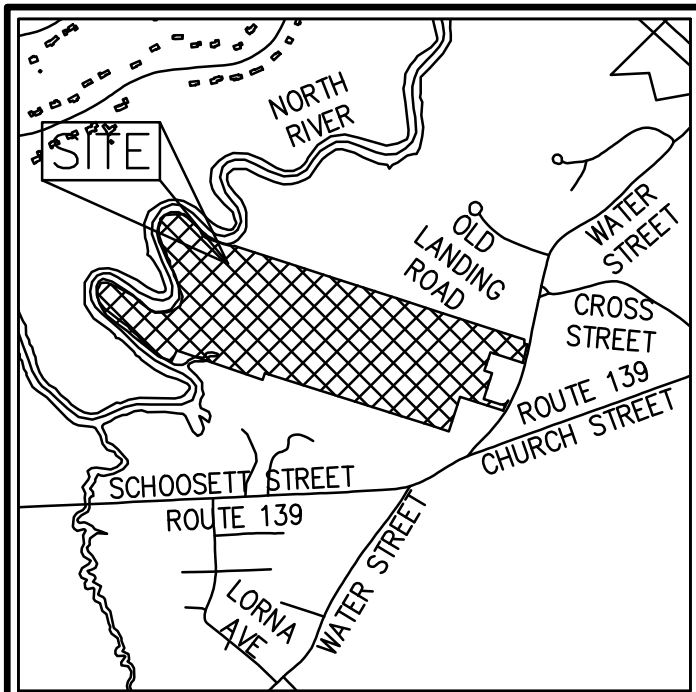
RIVER MARSH – PEMBROKE MA
COMPREHENSIVE PERMIT APPLICATION

TOWN OF PEMBROKE, MASSACHUSETTS
ZONING BOARD OF APPEALS

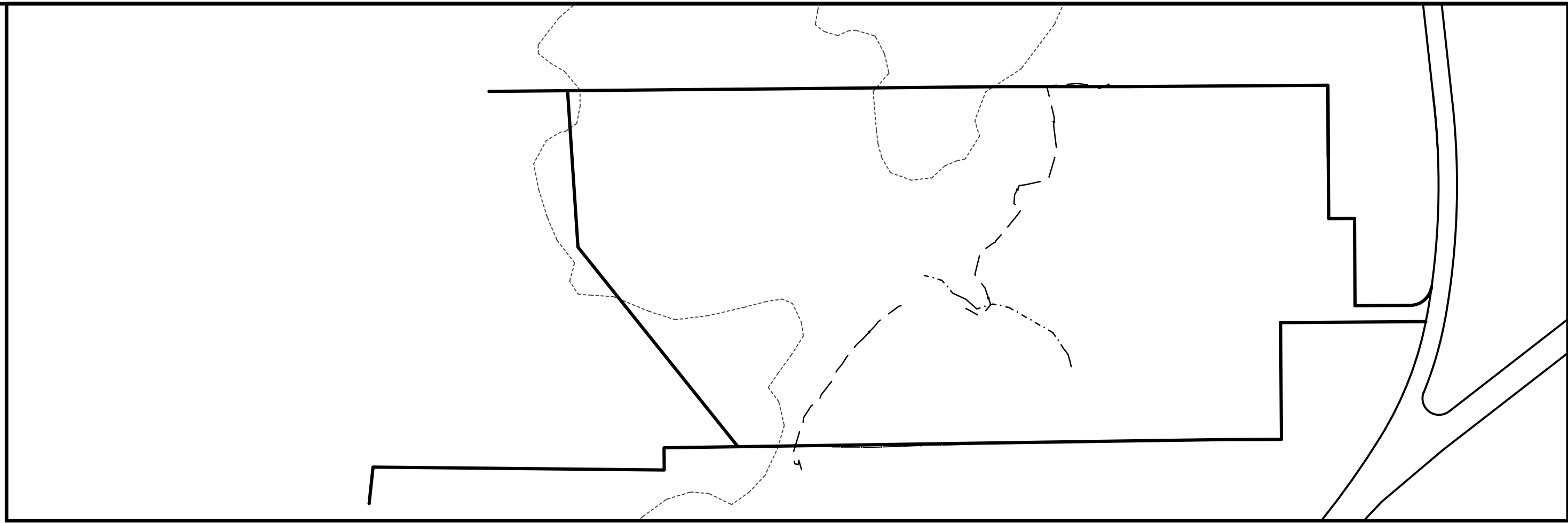
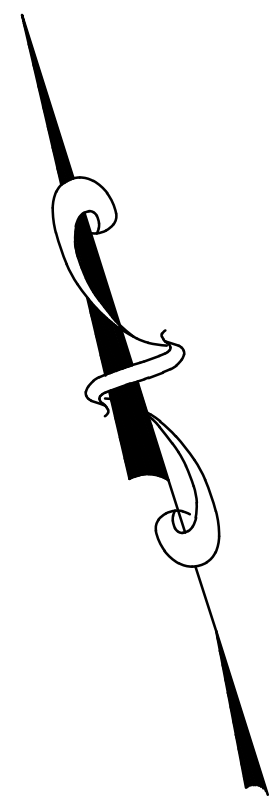
RE: APPLICANT'S PRIOR DEVELOPMENT PROJECTS

The Applicant is an entity created for the sole purpose of developing River Marsh, a multi-family housing development in accordance with M.G.L 40B, § 20-23, and therefore it has not completed any projects.

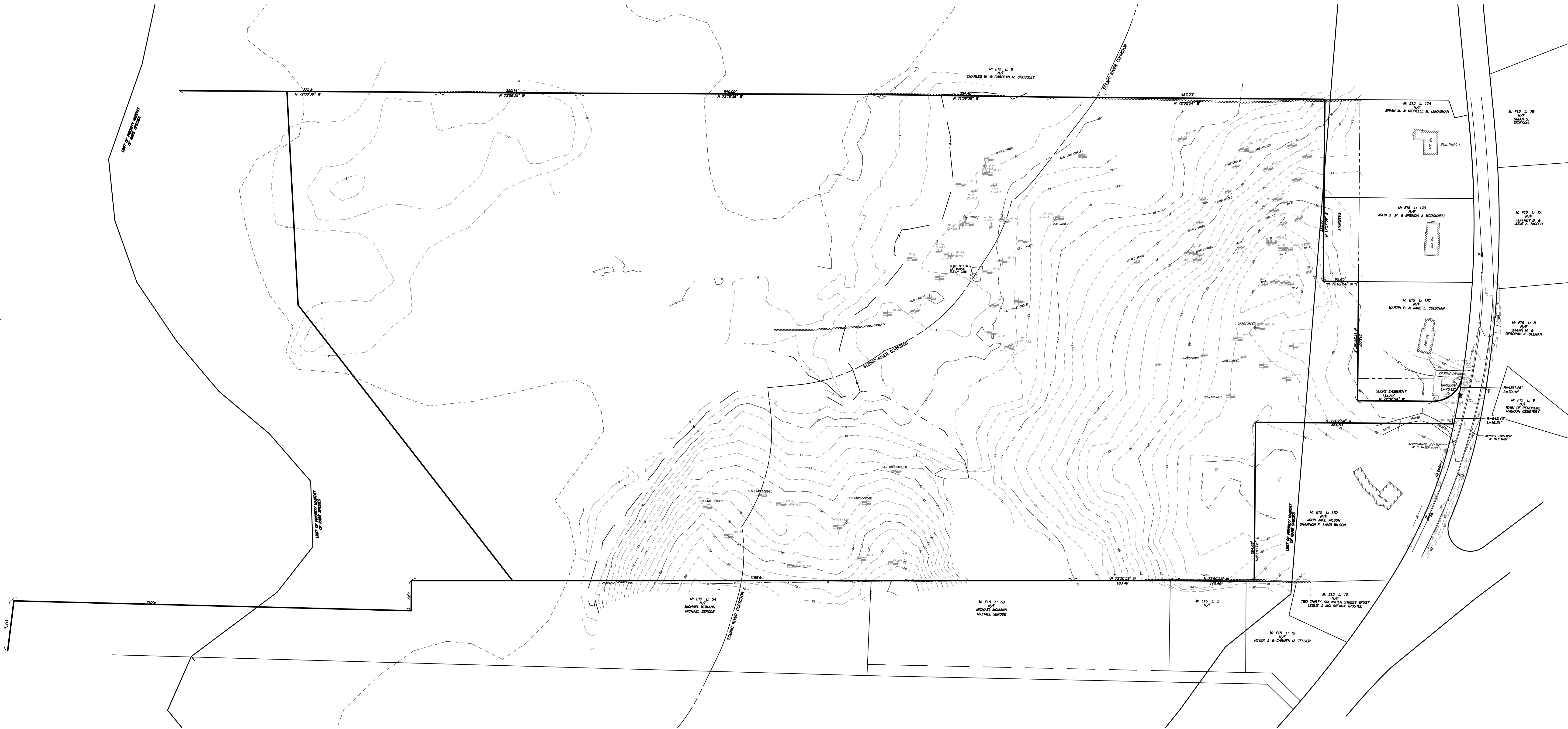
The Development Team behind the Applicant has successfully constructed commercial developments and residential developments that are similar in nature, such as Washington Woods that consists of seven residential buildings and associated site work on approximately 10 acres off Washington Street (Route 53) in Norwell, Massachusetts.



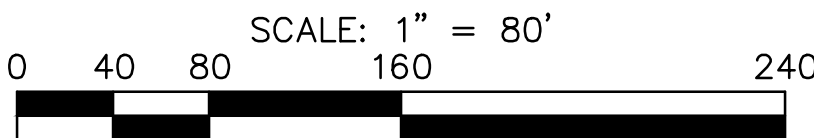
LOCUS MAP
Not to Scale



OVERALL MAP
1"=250'



NOTE:
EXISTING CONDITIONS INFORMATION OBTAINED
FROM AN ON-THE-GROUND SURVEY CONDUCTED
BY LAND PLANNING, INC. IN MAY OF 2002.



© MCKENZIE ENGINEERING GROUP, INC.

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RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN

(ASSESSORS MAP E-17, LOT 0 AND E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

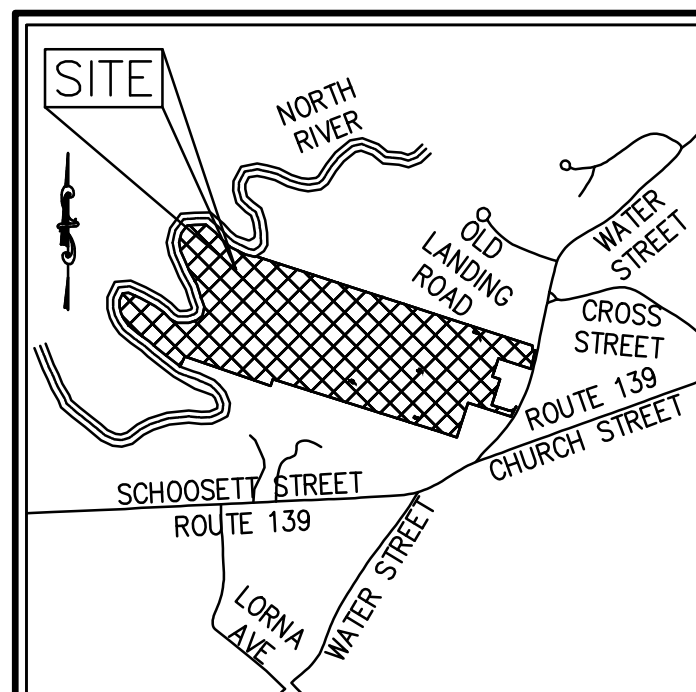
APPLICANT:
River Marsh, LLC
293R Washington Street
Norwell, Massachusetts 02061

DRAWN BY: SBS
DESIGNED BY: SBS
CHECKED BY: BCM
APPROVED BY: BCM
DATE: 8/10/2016
SCALE: 1"=80'
PROJECT NO.: 215-181

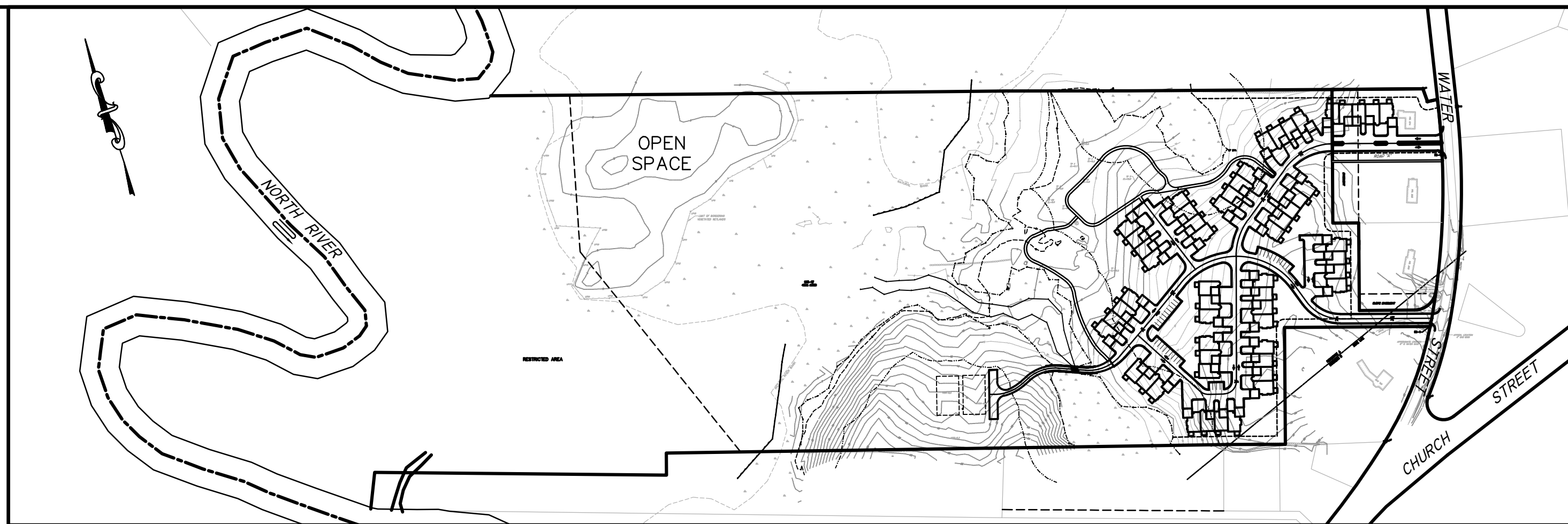
DWG. TITLE:
**EXISTING
CONDITIONS
PLAN**

DWG. No:
EX-1

PERMIT PLAN SET



LOCUS MAP
Not to Scale



OVERALL MAP
SCALE: 1"=250'

ABBREVIATIONS

APPROX. ASPH.
BIT.
CCB
CB
CONC.
DMH
EL
F.F.
GG
HYD
LP
N/F
No.
PROP
PVC
R
RCP
RD
REM
SMH
TYP.
M
VGC
WG

APPROXIMATE
ASPHALT
BITUMINOUS
BITUMINOUS CAPE COD BERM
CATCH BASIN
CONCRETE
DRAIN MANHOLE
ELEVATION
FIRST FLOOR
GAS GATE
HYDRANT
LENGTH
LIGHT POLE
NOW OR FORMERLY
NUMBER
PROPOSED
POLYVINYL CHLORIDE
RIM
REINFORCED CONCRETE PIPE
ROOF DRAIN
REMOVE
SEWER MANHOLE
TYPICAL
METER
VERTICAL GRANITE CURB
WATER GATE

BUILDING INDEX

(1) P1-UNIT BUILDING
(3) 3-UNIT BUILDINGS
(9) 4-UNIT BUILDINGS
(2) 5-UNIT BUILDINGS =56 TOTAL UNITS
(UNIT LAYOUT AND FLOOR AREAS VARY)
PARKING SUMMARY
56 UNITS X 4 SPACES =224 SPACES
VISITOR SPACES = 34 SPACES
PARKING PROVIDED =258 SPACES

OPEN SPACE AND DENSITY CALCULATIONS

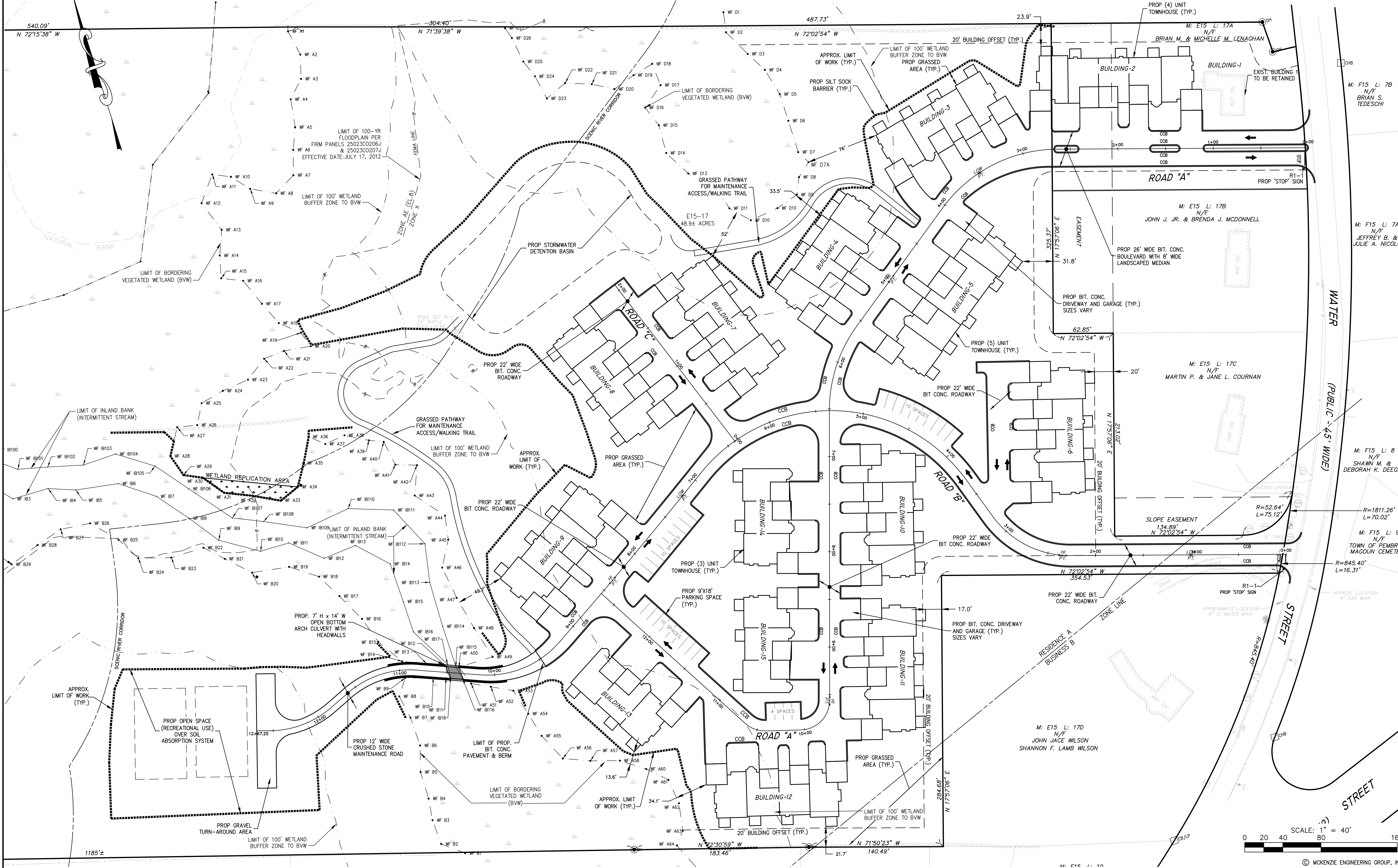
TOTAL LAND AREA = 48.9 AC.
UPLAND LAND AREA= 21.49 AC.
ROAD/PARKING AREA= 2.52 AC.
BUILDING AREA= 2.24 AC.
UPLAND OPEN SPACE= 16.73 AC.
UNIT DENSITY= 2.61 UNITS/UPLAND AC.

ROAD INDEX

ROAD A =1,267 LF
ROAD B =948 LF
ROAD C =207 LF
2,422 LF TOTAL LENGTH OF ROAD

SYMBOL LEGEND

■ CATCH BASIN
○ UTILITY POLE
○ SEWER MANHOLE
○ DRAIN MANHOLE
○ WATER GATE
○ HYDRANT
○ GAS GATE
○ LIGHT POLE
○ BOLLARD
○ ROOF DRAIN
○ DRAIN LINE
○ SEWER LINE
○ GAS MAIN
○ UNDERGROUND ELECTRIC
○ WATER LINE



RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN (ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274) PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

OWNER/APPLICANT:
RIVER MARSH, LLC
293R WASHINGTON STREET
NORWELL, MASSACHUSETTS 02061

DESIGNED BY: SBS
CHECKED BY: BCM
APPROVED BY: BCM
DATE: SEPTEMBER 22, 2016
SCALE: 1"=40'
PROJECT NO.: 215-181
DWG. TITLE:

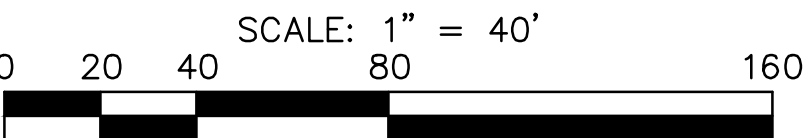
Preliminary
Site Layout
Plan

DWG. NO:

C-1

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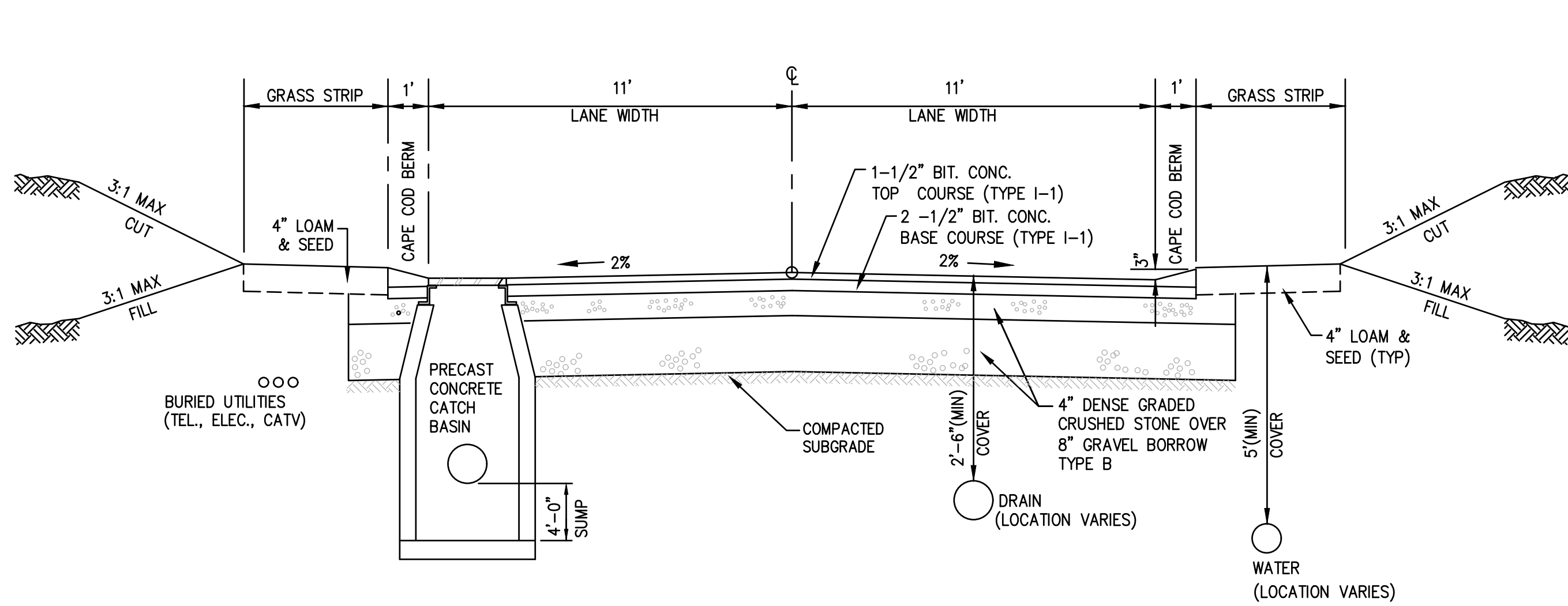
M:\V2015\PROJECTS\215-181\DWGS\OUT SHEETS\DATA APPLICATION\SUBMISSION NO 17215-181 C-1.DWG



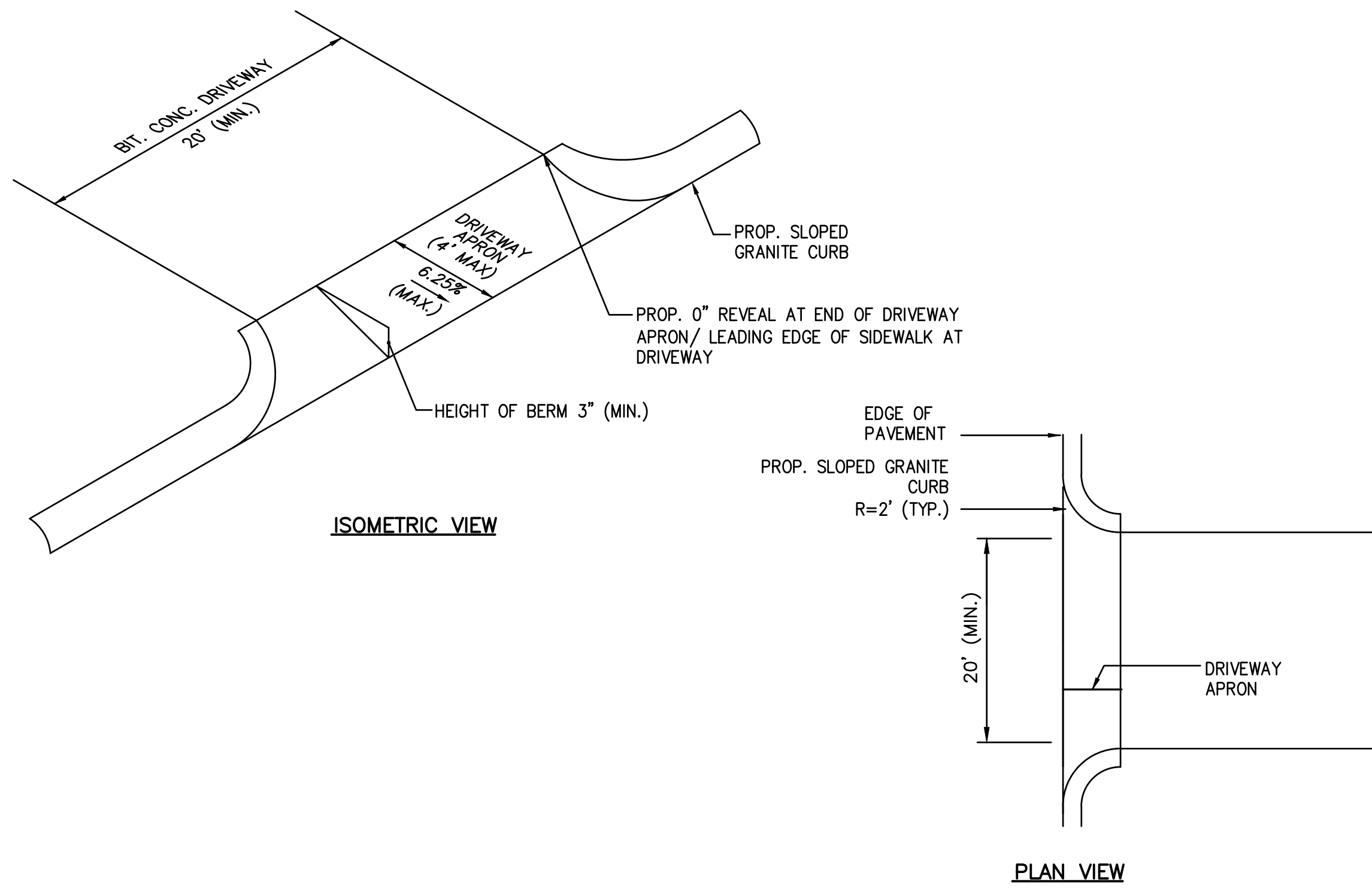
M:\MEG\2015 PROJECTS\215-181\DWGS\CUT SHEETS\2RA APPLICATION\SUBMISSION NO. 1\215-181_C-2.DWG

<div>BY: <div>APR</div></div> <div>REV: <div>1</div> <div>5/12/2017</div> <div>COMMENTS PER MASSHOUSING</div></div> <div>REV: <div>2</div> <div>7/14/2017</div> <div>COMMENTS PER MASSHOUSING</div></div> <div>REV: <div>3</div> <div>10/5/2018</div> <div>ZBA APPLICATION</div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> <div>REV: <div> </div> <div> </div> <div> </div></div> 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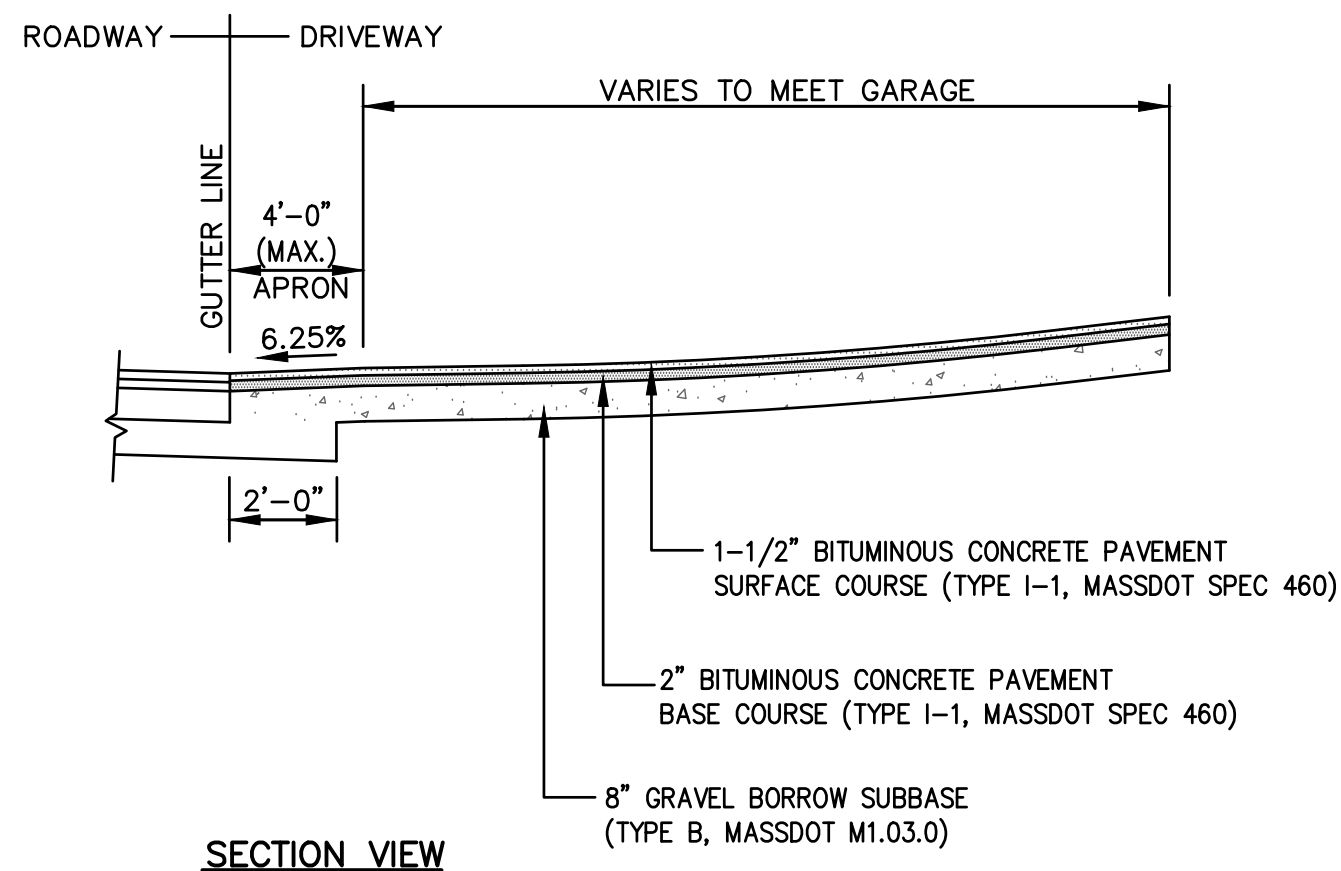
C-3



TYPICAL ROADWAY CROSS SECTION
SCALE: N.T.S.



TYPICAL DRIVEWAY DETAIL
SCALE: N.T.S.

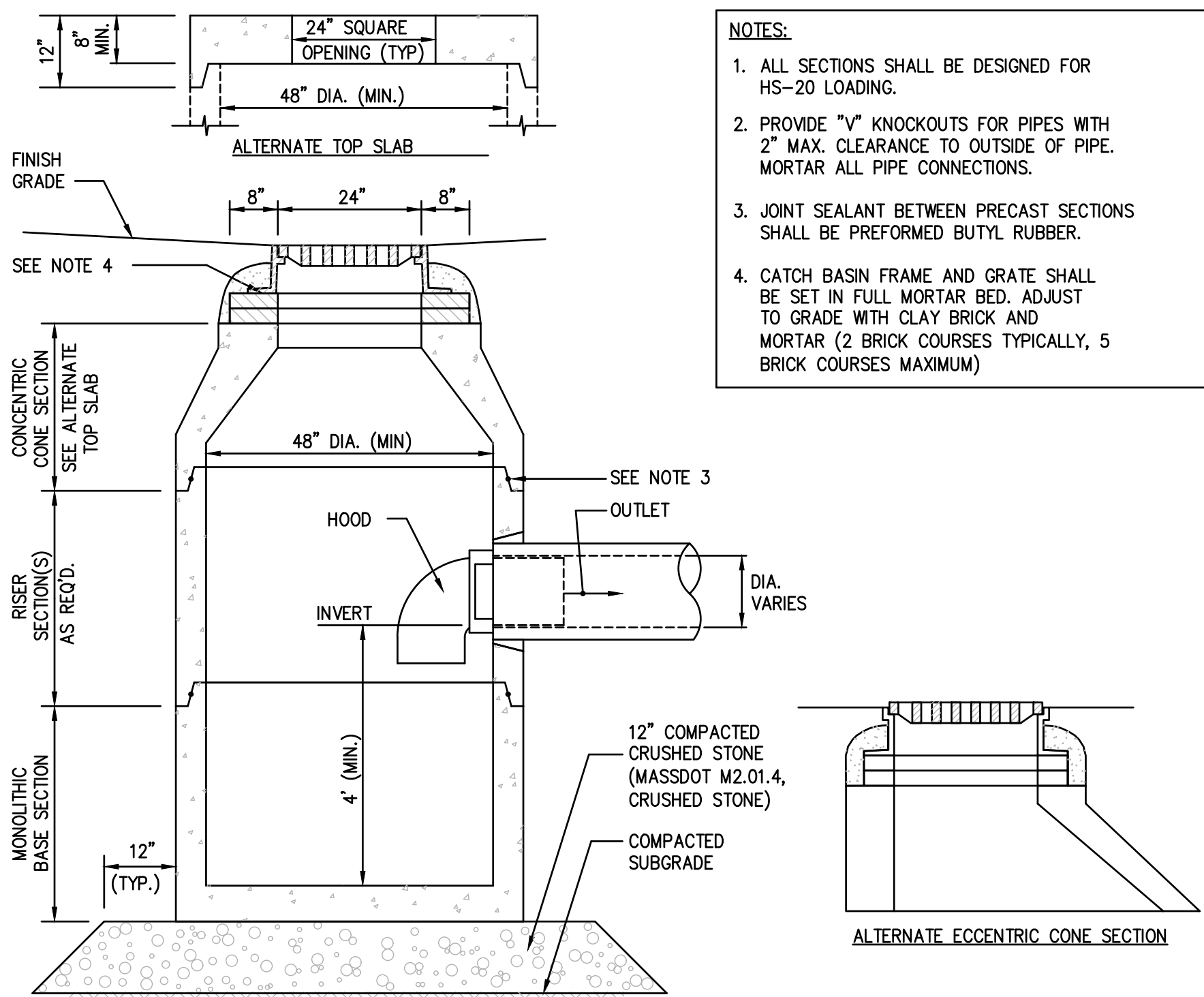


SECTION VIEW

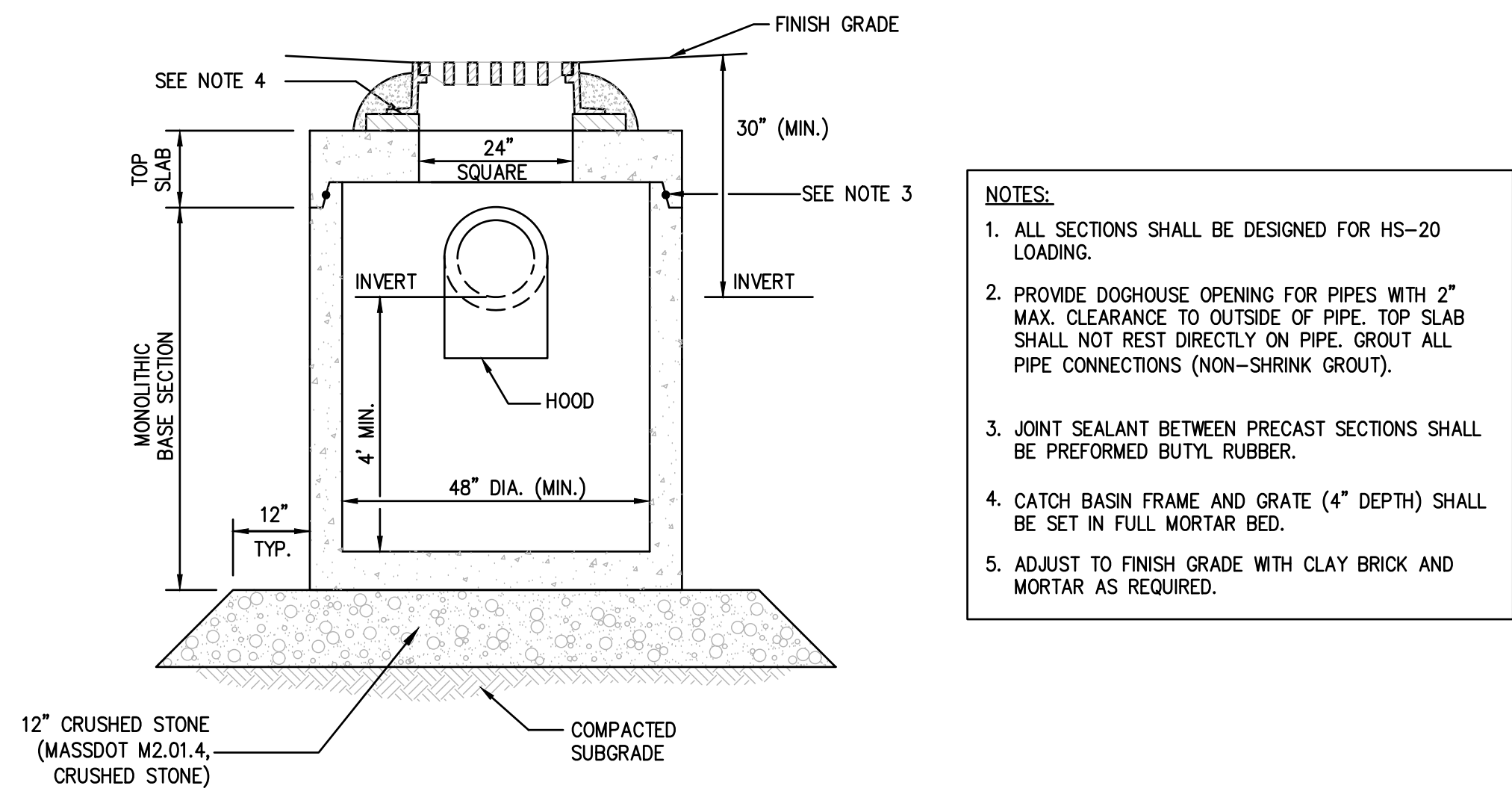
NOTE:
THE DRIVEWAY GRADE WITHIN 75' OF THE STREET LINE
SHALL NOT EXCEED 5%.

GENERAL UTILITY NOTES

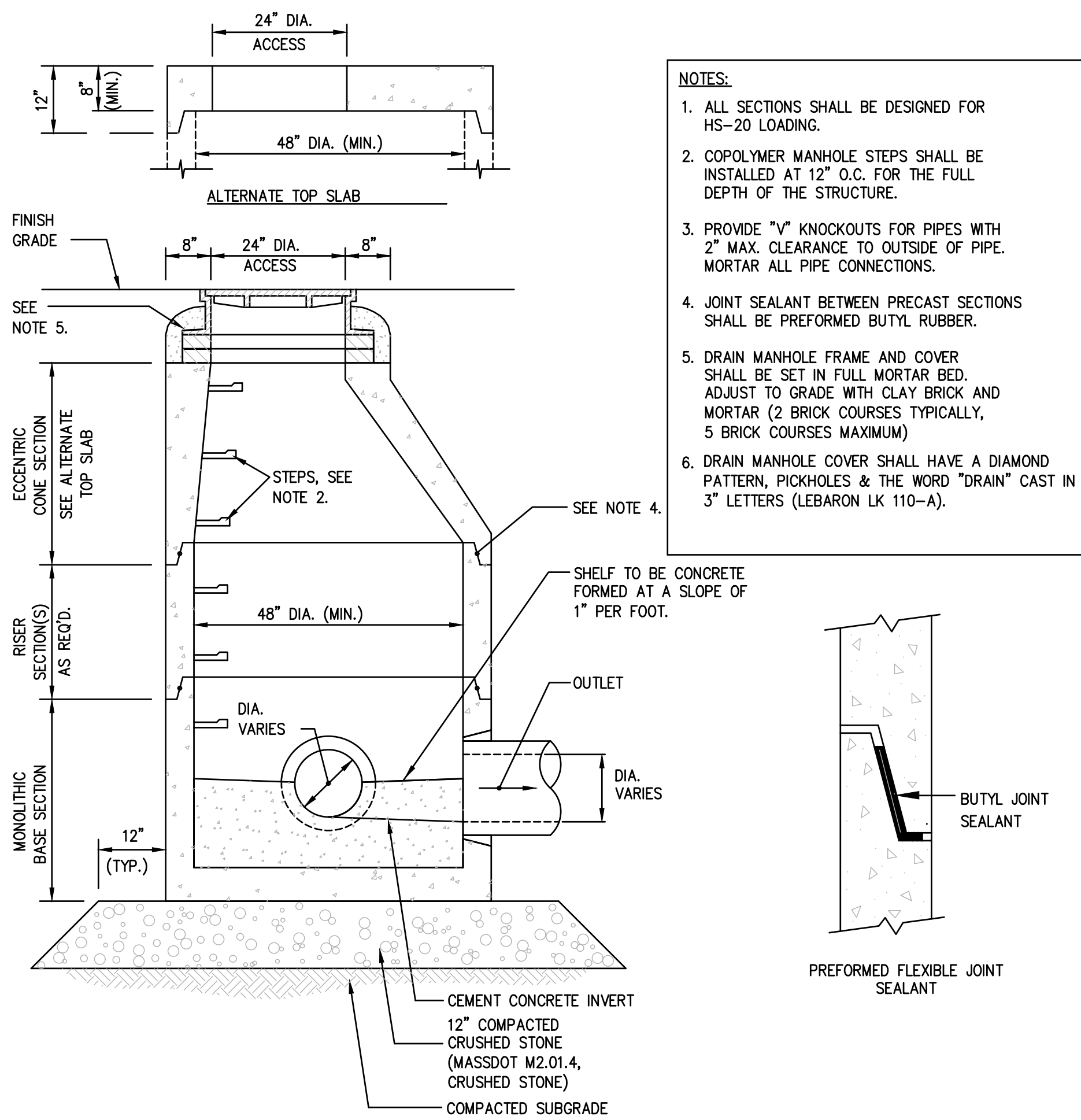
1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES AND THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCHMARKS NECESSARY FOR THE WORK.
3. THE CONTRACTOR SHALL EXCAVATE THE TEST PITS IN THE LOCATIONS SHOWN ON THE PLAN PRIOR TO COMMENCING WORK TO VERIFY THE ELEVATIONS AND LOCATIONS OF EXISTING UTILITIES. THE CONTRACTOR SHALL PROVIDE THE OWNER AND ENGINEER WITH THE RESULTS PRIOR TO COMMENCING ANY WORK.
4. ALL WATER SERVICES SHALL BE INSTALLED WITH 5' OF COVER EXCEPT AS NOTED OR DETAILED OTHERWISE.
5. DOMESTIC WATER SERVICES 2 INCHES AND SMALLER SHALL BE TYPE K COPPER TUBING AND SHALL BE INSTALLED WITH APPROPRIATELY SIZED CORPORATION STOP WITH APPROVED SADDLE, CURB STOP, GATE AND BOX.
6. SEE SHEET C-10 FOR PEMBROKE WATER DEPT. CONSTRUCTION DETAILS, NOTES, AND SPECIFICATIONS.
7. THE CONTRACTOR SHALL PROVIDE INLET PROTECTION, SUCH AS SILT SACKS, AT ALL CATCH BASINS TO PREVENT SEDIMENT FROM ENTERING THE EXTENDED DETENTION WETLAND AREA. INLET PROTECTION WILL ALLOW THE STORM DRAIN INLETS TO BE USED BEFORE FINAL STABILIZATION.
8. THE CONTRACTOR SHALL PROVIDE SIEVE ANALYSIS SUBMITTALS TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION OF THE SAND/SILT MATERIAL TO BE USED.



CATCH BASIN W/HOOD
SCALE: N.T.S.

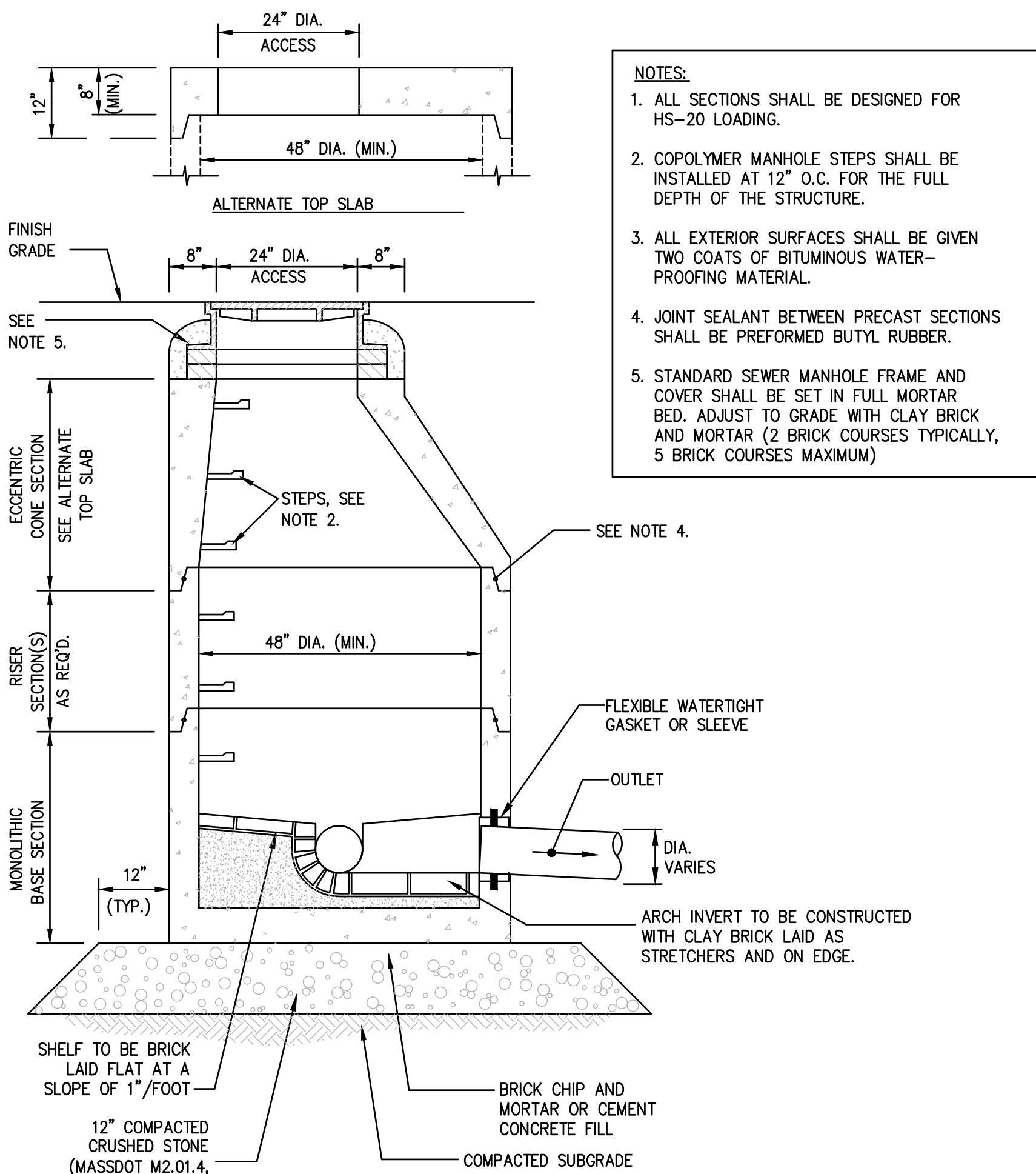


SHALLOW CATCH BASIN W/HOOD
SCALE: N.T.S.

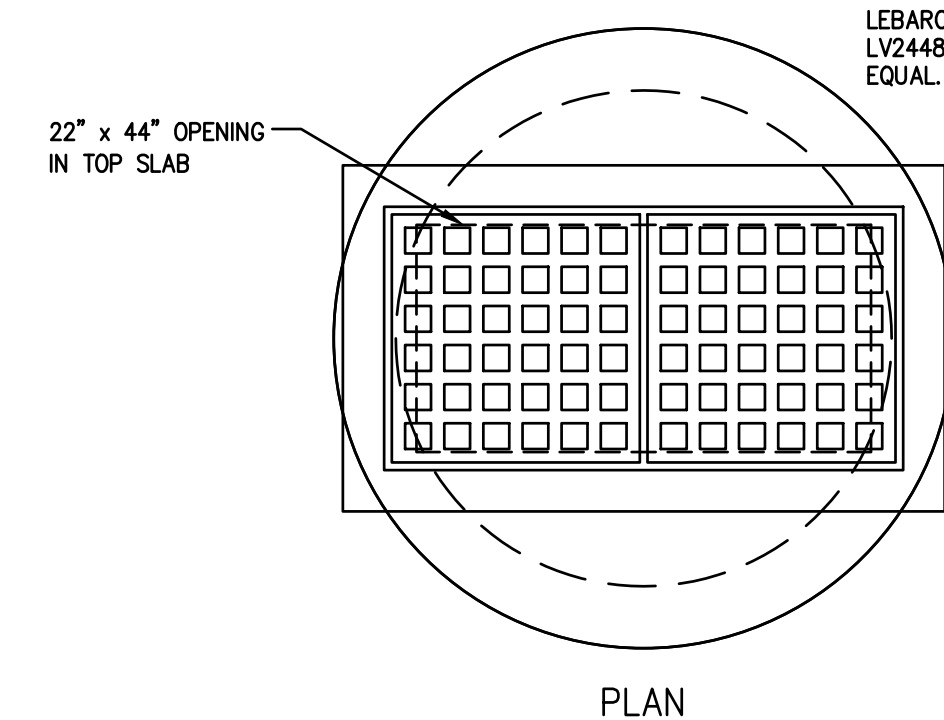


DRAIN MANHOLE DETAIL
SCALE: N.T.S.

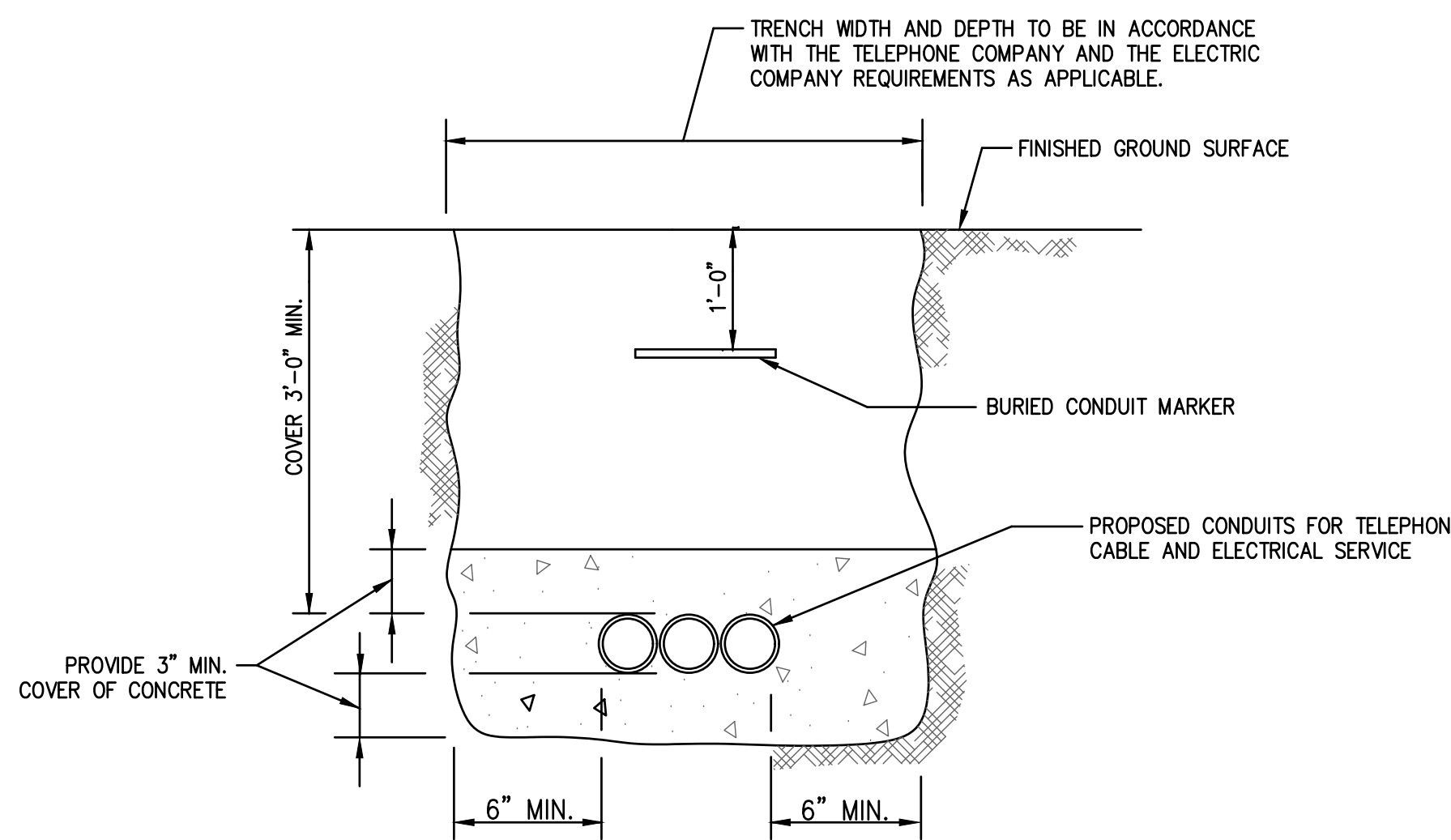
MANHOLE JOINT DETAILS
SCALE: N.T.S.



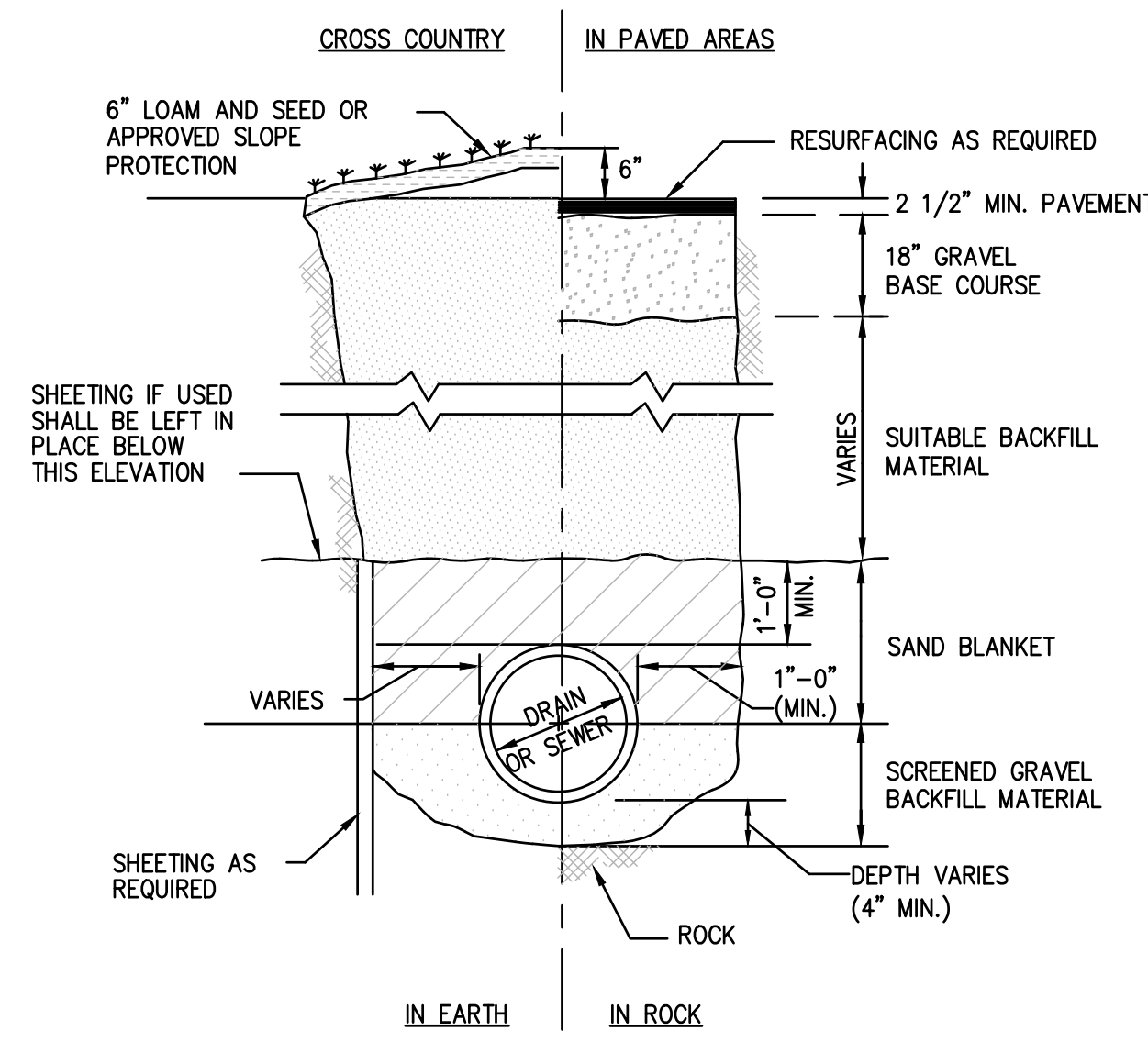
SEWER MANHOLE DETAIL
SCALE: N.T.S.



DOUBLE GRATE CATCH BASIN DETAIL
SCALE: N.T.S.



TYPICAL ELECTRIC/TELEPHONE/CABLE CONDUIT
(US-UTILITY SERVICE)
SCALE: N.T.S.



TYPICAL TRENCH DETAIL
SCALE: N.T.S.

RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

OWNER/APPLICANT:
RIVER MARSH, LLC
230R WASHINGTON STREET
NORWELL, MASSACHUSETTS 02061

DRAWN BY: SBS
DESIGNED BY: SBS
CHECKED BY: BCM
APPROVED BY: BCM
DATE: SEPTEMBER 22, 2016
SCALE: AS NOTED
PROJECT NO.: 215-181
DWG. TITLE:

CONSTRUCTION
DETAILS
SHEET 1 OF 4

DWG. NO:

C-4

Seeding Recommendations

- a. Surface and seepage water should be drained or diverted from the site to prevent drowning or winter killing of the plants.
- b. Stones larger than four inches and trash should be removed because they interfere with seeding and future maintenance of the area. Where feasible, the soil should be tilled to a depth of about four inches to prepare a seedbed and mix fertilizer and lime into the soil. The seedbed should be left in a reasonably firm and smooth condition. The last tillage operation should be performed across the slope wherever practical.

- a. Lime and fertilizer should be applied prior to or at the time of seeding and incorporated into the soil. Kinds and amounts of lime and fertilizer should be based on evaluation of soil tests. When a soil test is not available, the following minimum amounts should be applied:

Agricultural limestone: 2 tons per acre or 100 lbs. per sq. ft.
 Nitrogen (N): 50 lbs. per acre or 1.1 lbs. per 1000 sq. ft.
 Phosphate (P_2O_5): 100 lbs. per acre or 2.2 lbs. per 1000 sq. ft.
 Potash (K_2O): 100 lbs. per acre or 2.2 lbs. per 1000 sq. ft.
 (Note: This is the equivalent of 500 lbs. per acre of 10-20-20 fertilizer of 1,000 lbs. per acre of 5-10-10)

- b. Seed should be spread uniformly by the method most appropriate for the site. Methods include broadcasting, drilling, and hydroseeding. Where broadcasting is used, cover seed with 0.25 inch of soil or less, by cultipacking or raking.
- c. Refer to Seeding Rates and Seeding Guides for appropriate seed mixtures and rates of seeding.

- d. When seeded areas are mulched, plantings may be made from early spring to early October. When seeded areas are not mulched, plantings should be made from early spring to May 20 or from August 10 to September 1.

- a. Hay, straw, or other mulch, when needed, should be applied immediately after seeding.

- Planted areas should be protected from damage by fire, grazing, traffic, and dense weed growth.
- Fertilization needs should be determined by onsite inspections. Supplemental fertilizer is usually the key to fully complete the establishment of the stand because most perennials take 2 to 3 years to become established.
- In waterways, channels, or swales where uniform flow conditions are anticipated, occasional mowing may be necessary to control growth of woody vegetation.

POUND / ACRE POUNDS / 1,000 S.F.

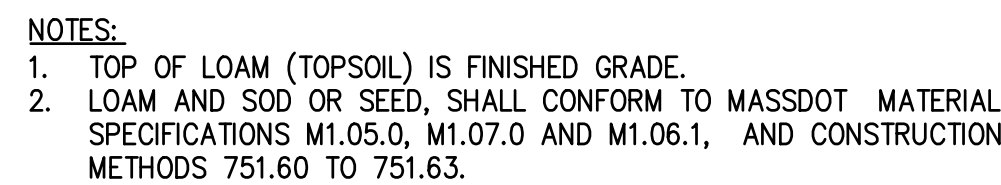
A. tall fescue	20	0.45
creeping red fescue	20	0.45
redtop	2	0.05
total	42	0.95
B. tall fescue	15	0.35
creeping red fescue	10	0.25
birdsfoot trefoil	15	0.35
total	40	0.95
C. tall fescue	20	0.45
creeping red fescue	20	0.45
birdsfoot trefoil	8	0.20
total	48	1.10
D. birdsfoot trefoil	10	0.25
redtop	5	0.10
reed canary grass	15	0.35
total	30	0.70
E. tall fescue	20	0.45
flatpea	30	0.75
total	50	1.20
F. creeping red fescue 1/ kentucky bluegrass 1/ total	85 85 170	2.00 2.00 4.00
G. tall fescue 1/ total	150 150	3.60 3.60

H. winter rye	112	2.50	(Best for fall seeding, Aug 15 to Sept. 5)
oats	80	2.00	(Best for spring seeding, before May 15)
annual ryegrass	40	1.00	(Best for fall seeding, Aug 15 to Sept. 15) (may be used early spring also)

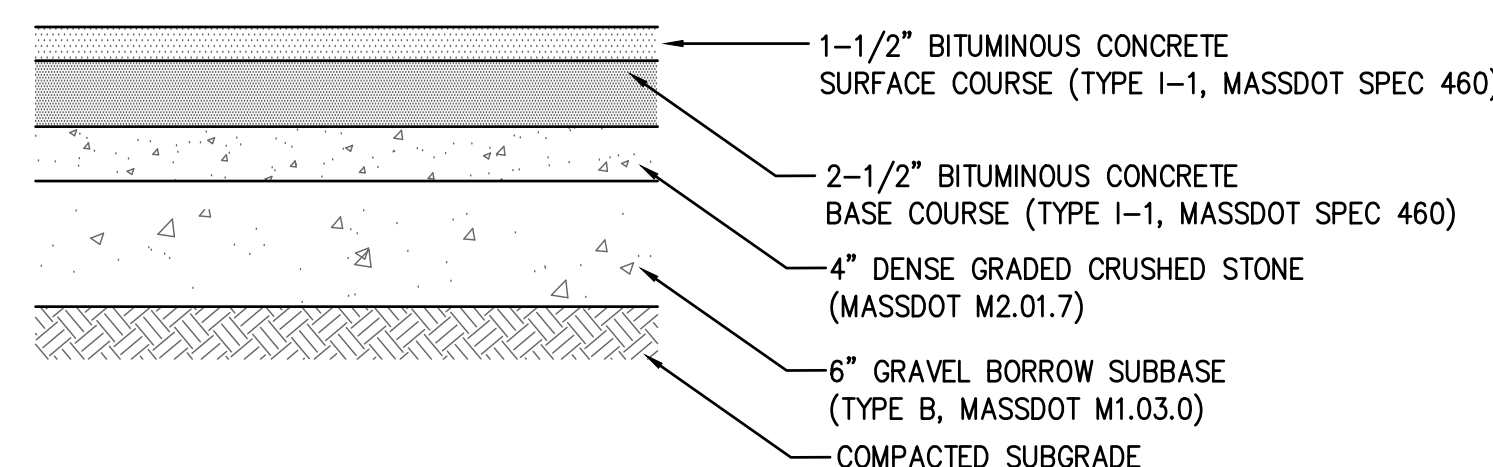
1/ for heavy use athletic fields consult the University of New Hampshire Cooperative Extension Turf Specialist for current varieties and seeding rates.

Seeding
mixture 1/

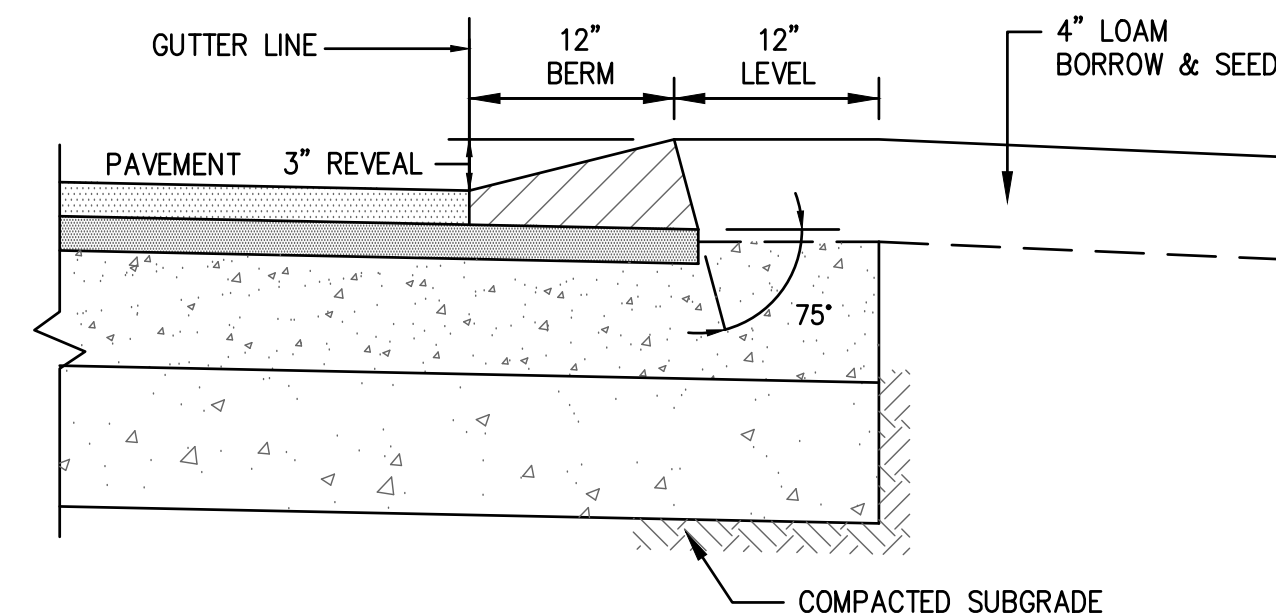
Habitats	
steep cuts and fills, borrow and disposal areas	E
waterways, emergency spillways, and other channels with flowing water	D
lawn areas	F



SCALE: N.T.S.

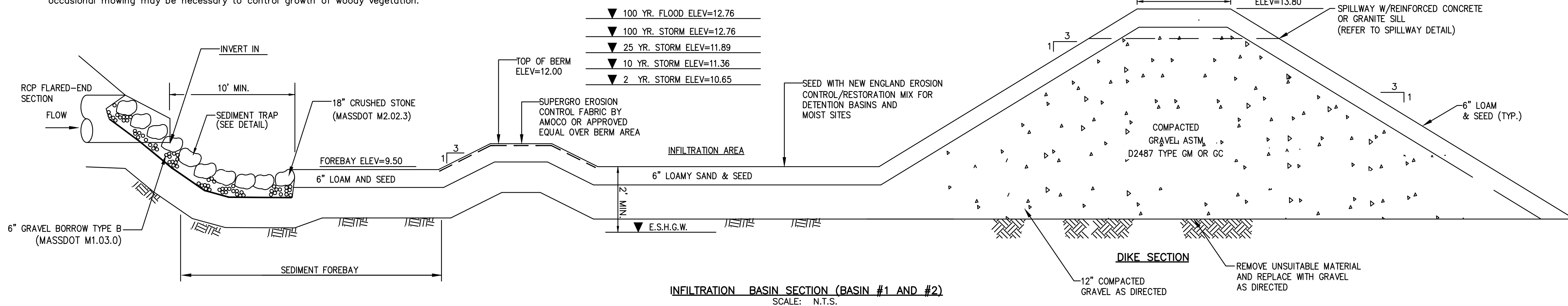


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SCALE: N.T.S.

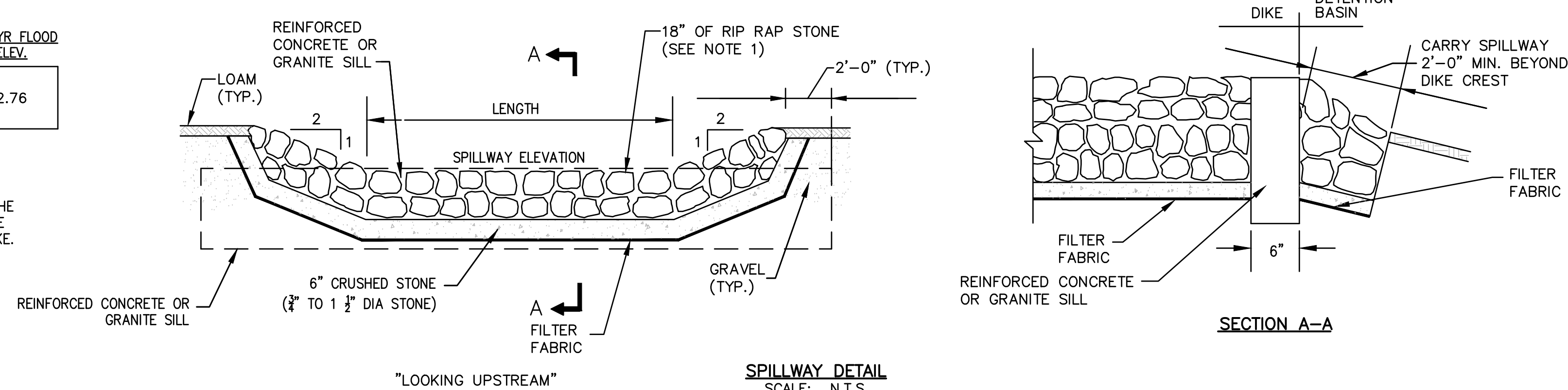
1. FILL AND BASE FOR DIKES SHALL INSURE WATER TIGHTNESS AND STABILITY.
2. BASIN SIDE SLOPES AND BOTTOM SHALL BE PROVIDED WITH 6" OF LOAMY SAND, SEEDED AT A RATE OF 25 POUNDS OF RED TOP, 15 POUNDS OF CREEPING RED FESCUE AND 20 POUNDS TALL FESCUE PER ACRE.
3. THE CONTRACTOR SHALL NOT DISCHARGE SEDIMENT-LADEN WATER TO INFILTRATION BASIN COMPONENTS DURING CONSTRUCTION, INCLUDING DEWATERING OR TEMPORARY SURFACE RUNOFF.
4. ALL CONTRIBUTING AREAS TO THE BASIN SHALL BE FULLY STABILIZED PRIOR TO THE BASIN BEING PLACED INTO SERVICE.
5. THE CONTRACTOR SHALL PROVIDE PROTECTION ABOVE AND AROUND THE INFILTRATION AREA OF THE BASIN FROM CONSTRUCTION VEHICLE ACTIVITY. NO HEAVY EQUIPMENT SHALL BE ALLOWED ON THE BASIN FLOORS AFTER INSTALLATION. CONTRACTOR SHALL MINIMIZE CONSTRUCTION EQUIPMENT TRAFFIC WITHIN THE BASIN AT ALL TIMES DURING AND AFTER CONSTRUCTION.



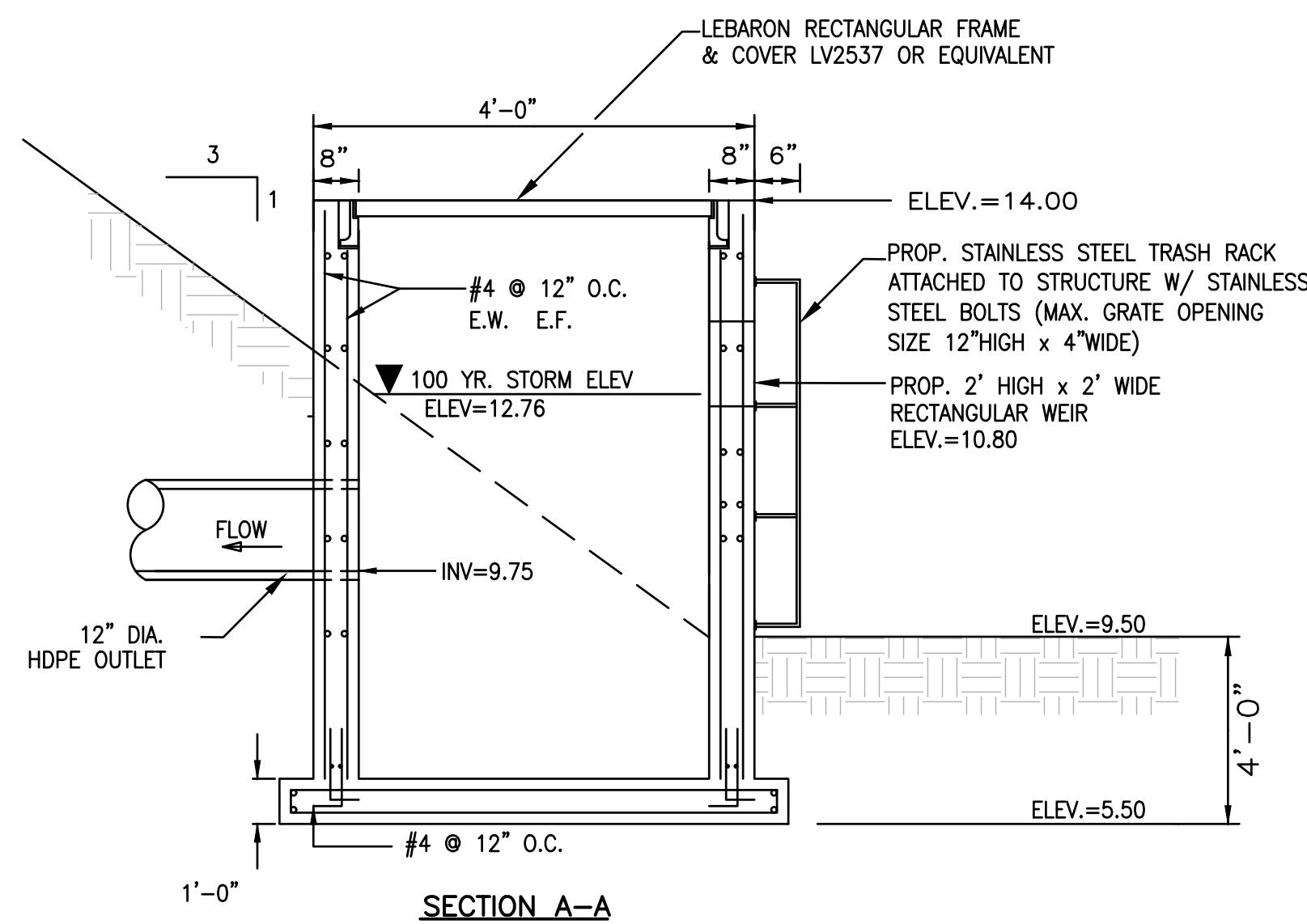
<u>BASIN</u>	<u>SPILLWAY ELEV.</u>	<u>LENGTH</u>	<u>100-YR FLOOD ELEV.</u>
1	12.32	10 FT	12.76

NOTE:

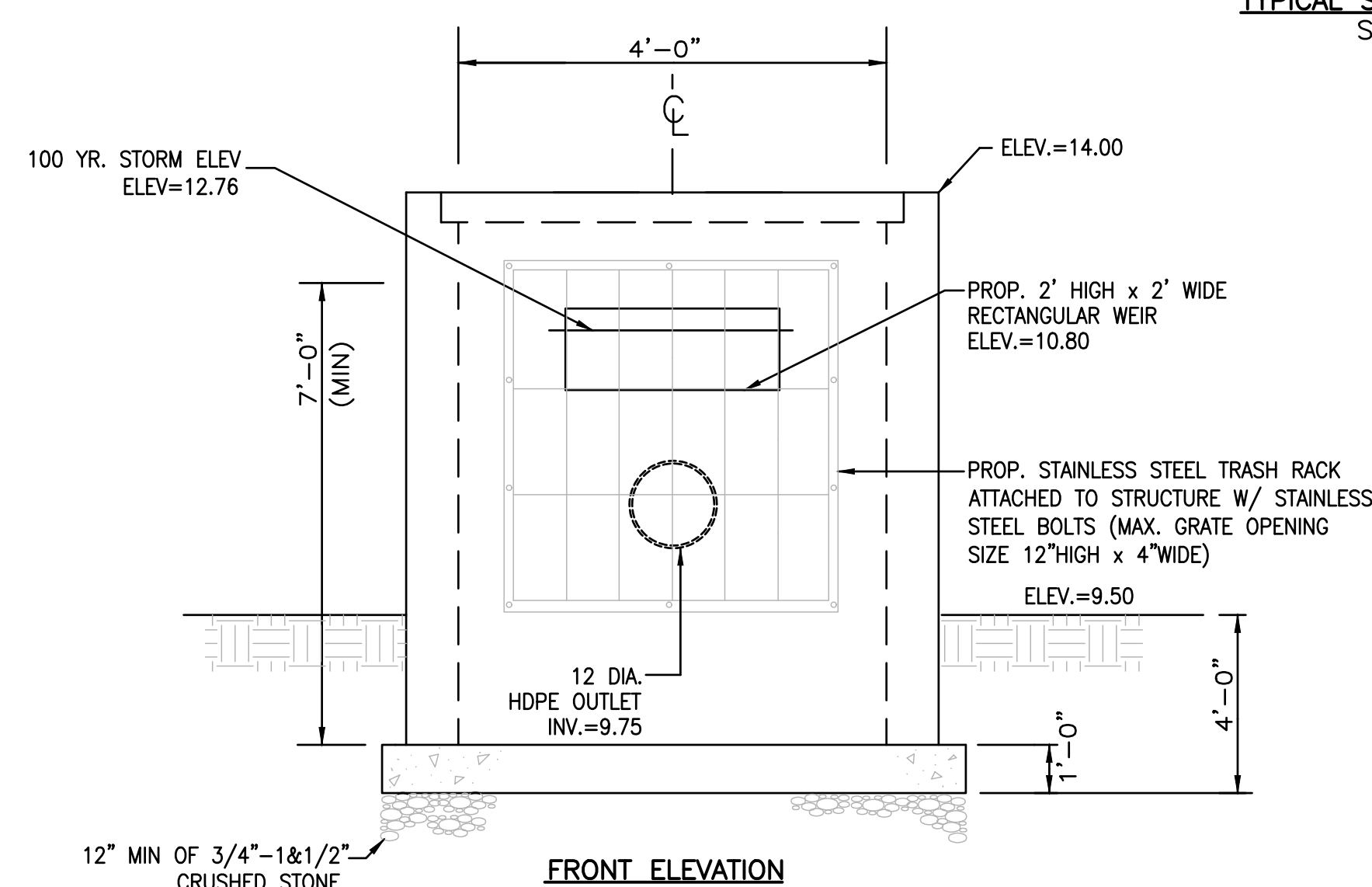
1. RIP RAP TO BE HAND CHINKED WITH A SMOOTH SURFACE ALONG THE TOP OF THE DIKE AND A ROUGH SURFACE ALONG THE DOWNSTREAM FACE AND TOE OF THE DIKE. STONE TO MEET MASSDOT (M2.02.3) REQUIREMENTS.



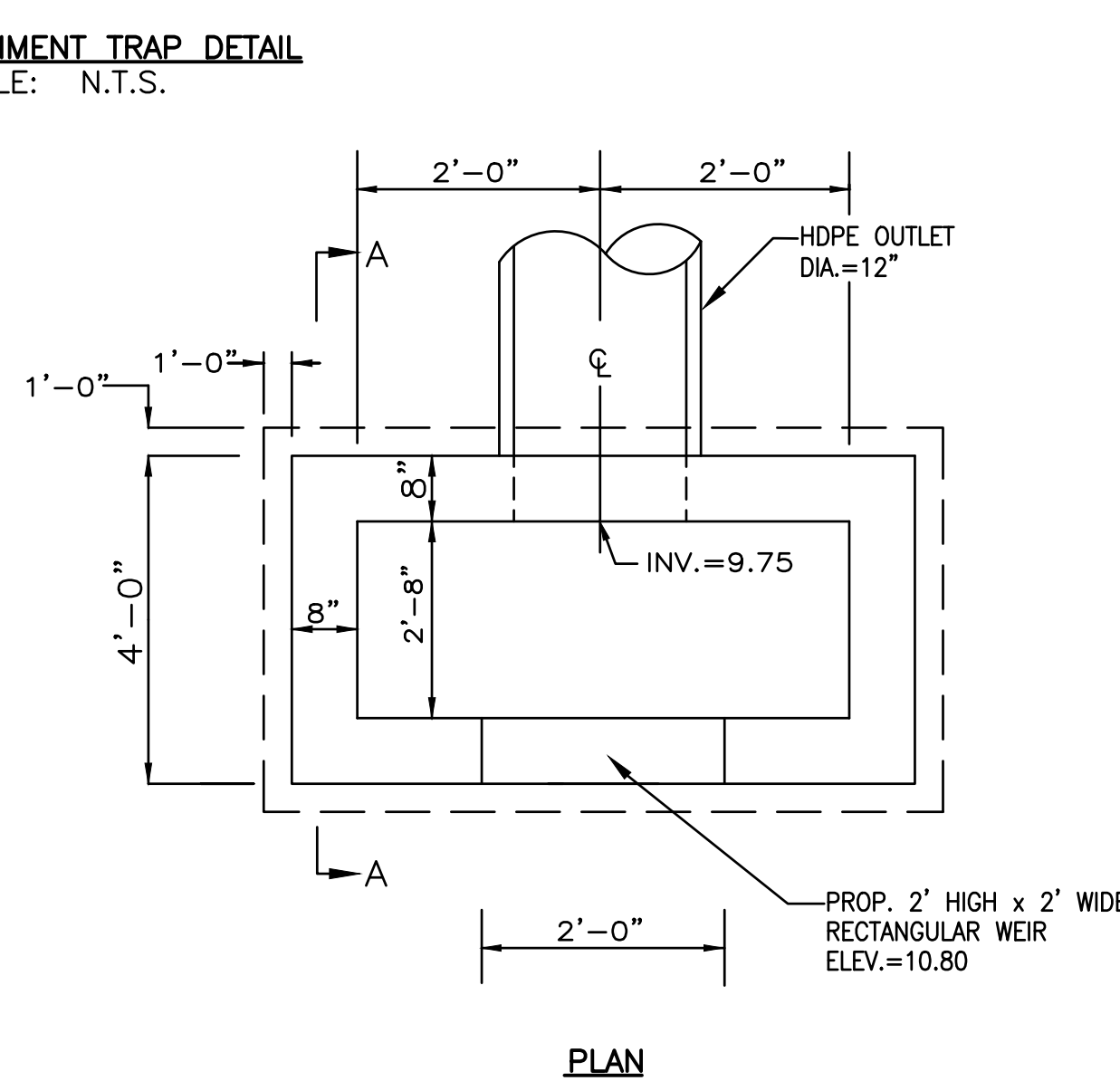
SCALE: N.T.S.



SECTION A-A




SCALE: N.T.S.



PLAN

REV	DATE	DESCRIPTION	BY	APP
1	5/12/2017	COMMENTS PER MASSHOUSING	SSIS	BOB
2	7/14/2017	COMMENTS PER MASSHOUSING	SSIS	BOB
3	10/5/2018	ZBA APPLICATION	AAC	BOB

PREPARED BY:



MCKENZIE
ENGINEERING GROUP

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www.mkenzeng.com

**RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN**
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

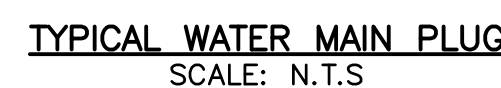
OWNER/APPLICANT:
RIVER MARSH, LLC
293R WASHINGTON STREET
NORWELL, MASSACHUSETTS 02061

DRAWN BY:	SBS
DESIGNED BY:	SBS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	SEPTEMBER 22, 2016
SCALE:	AS NOTED
PROJECT NO.:	215-181
DWG. TITLE:	

CONSTRUCTION
DETAILS
SHEET 2 OF 4

DWG. NO:

C-5

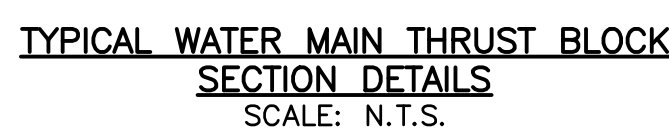


* TYPE OF SOIL IS MEDIUM CLAYEY, 6 OR MORE BLOWS PER FOOT, OR LOOSE GRANULAR, 9 OR MORE BLOWS PER FOOT. SOIL CONDITIONS OTHER THAN THOSE GIVEN WILL REQUIRE LARGER BEARING AREAS.

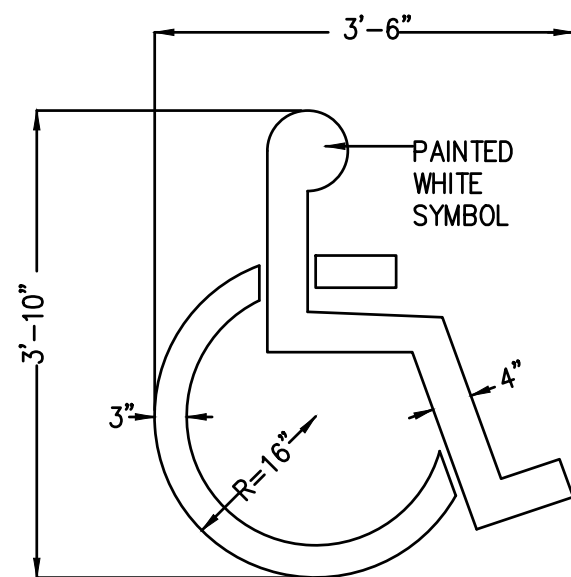
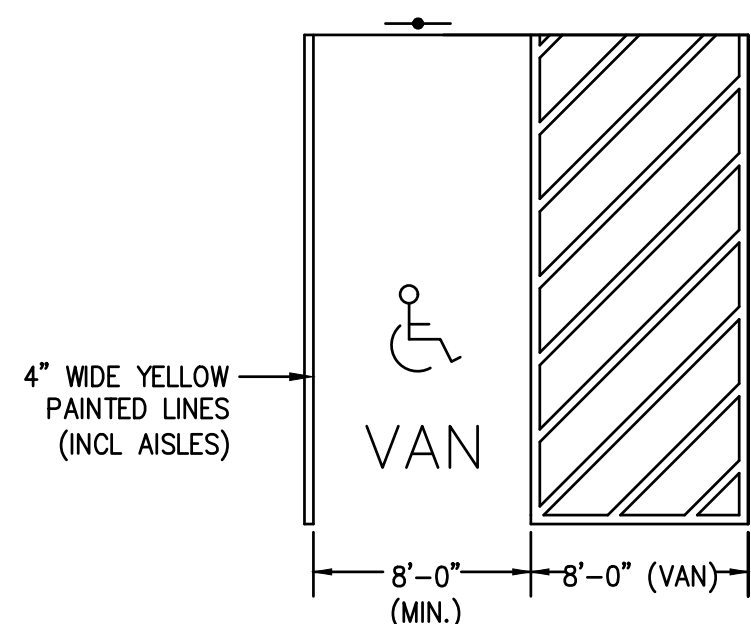
1. FOR FITTINGS WITH LESS THAN 45 DEGREES DEFLECTION, USE BEARING AREAS FOR 45 DEGREES.
2. BEARING AREAS BASED ON HORIZONTAL PASSIVE SOIL PRESSURE OF 2000 P.S.F. AND INTERNAL WATER PRESSURE OF 150 P.S.I.G. JOINTS SHALL NOT BE ENCASED IN CONCRETE. BEARING AREAS MAY BE DEDICATED FOR TRENCHES IN ROCK WHERE THE TOP OF THE ROCK FACE IS AT OR ABOVE THE CROWN OF THE PIPE. HOWEVER, CONCRETE BACKING SHALL BE PLACED BETWEEN THE PIPE AND THE ROCK FACE.
3. THE CONTRACTOR SHALL SUBMIT 2 WEEKS IN ADVANCE OF PLACEMENT, WORKING DRAWINGS FOR EACH THRUST BLOCK TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
4. ALL TEES, GATE VALVES, HYDRANTS AND FITTINGS SHALL BE MECHANICAL JOINTS WITH MEGA-LUGS.
5. THRUST BLOCKS SHALL BE BARREL BLOCKS.



	ANCHOR BLOCK DIMENSIONS (FT.)		
SIZE OF GATE VALVE	A	B	
		200 PSI TEST	250 PSI TEST
3"	1.5	1.5	2.0
4"	2.0	1.5	2.0
6"	3.0	1.5	2.0
8"	3.0	1.5	2.0
10"	3.0	2.0	2.5
12"	3.5	2.0	2.5



* WHERE THE SIZE OF THE CONNECTION EXCEEDS THAT GIVEN IN THE TABLE A BOSS SHALL BE PROVIDED OR THE TAP SHALL BE MADE BY MEANS OF MULTIPLE CORP. STOPS AND BRANCH FITTINGS, TAPPED TEE, OR TAPPED SADDLE.



- | | |
|--|--|
| 1. IF SHEETING IS USED, IT SHALL BE CUT OFF NO MORE THAN 12" ABOVE TOP OF PIPE. | 6. BACKFILL IS TO BE COMPACTED TO 90% MAXIMUM DRY DENSITY BY AASHTO T-180 D. |
| 2. ALL PIPES SHALL BE PRESSURE TESTED AT 200 PSI WORKING PRESSURE FOR A MINIMUM DURATION OF TWO HOUR. | 7. ALL WATER PIPE SHALL BE LAID WITH A MINIMUM OF 5 FEET OF COVER OF APPROVED MATERIALS. |
| 3. WATER SYSTEM IS TO BE DISINFECTED TO 50 P.P.M. AVAILABLE CHLORINE AND AFTER 24 HOURS TO 25 P.P.M. OR AS REQUIRED BY PEMBROKE WATER SUPERINTENDENT/ENGINEER. | 8. ALL HYDRANT LOCATIONS ARE TO BE APPROVED BY FIRE DEPARTMENT. |
| 4. WATER PIPE IS TO BE CEMENT UNED DUCTILE IRON "TYTON" OR EQUAL TYPE JOINT, conforming to A.N.S.I./A.W.W.A. C150/A21.50, CLASS 52, AS APPROVED BY THE PEMBROKE WATER SUPERINTENDENT/ENGINEER. | 9. RESULTS FROM PRESSURE TESTING AND DISINFECTION SHALL BE FURNISHED TO THE DIRECTOR OF PUBLIC WORKS FOR APPROVAL PRIOR TO WATER BEING TURNED ON |
| 5. ALL PIPING SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH A.W.W.A. STANDARDS PRIOR TO PAVING IF PAVING ABOVE TRENCH IS REQUIRED. | 10. ALL WORK SHALL BE IN CONFORMANCE WITH PEMBROKE WATER DEPARTMENT STANDARDS. |
| | 11. ALL PERMITS REQUIRED FOR STREET OPENINGS AND WATER MAIN TAPPING MUST BE OBTAINED. |
| | 12. NO WATER WILL BE TURNED ON IN THE PROJECT WITHOUT WATER DEPARTMENT APPROVAL. |

ALL WATER MAIN MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE PEMBROKE WATER DEPARTMENT RULES AND REGULATIONS.



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RIVER MARSH VILLAGE
COMPREHENSIVE PERMIT PLAN
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
WATER STREET
PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

OWNER/APPLICANT:
RIVER MARSH, LLC
293R WASHINGTON STREET
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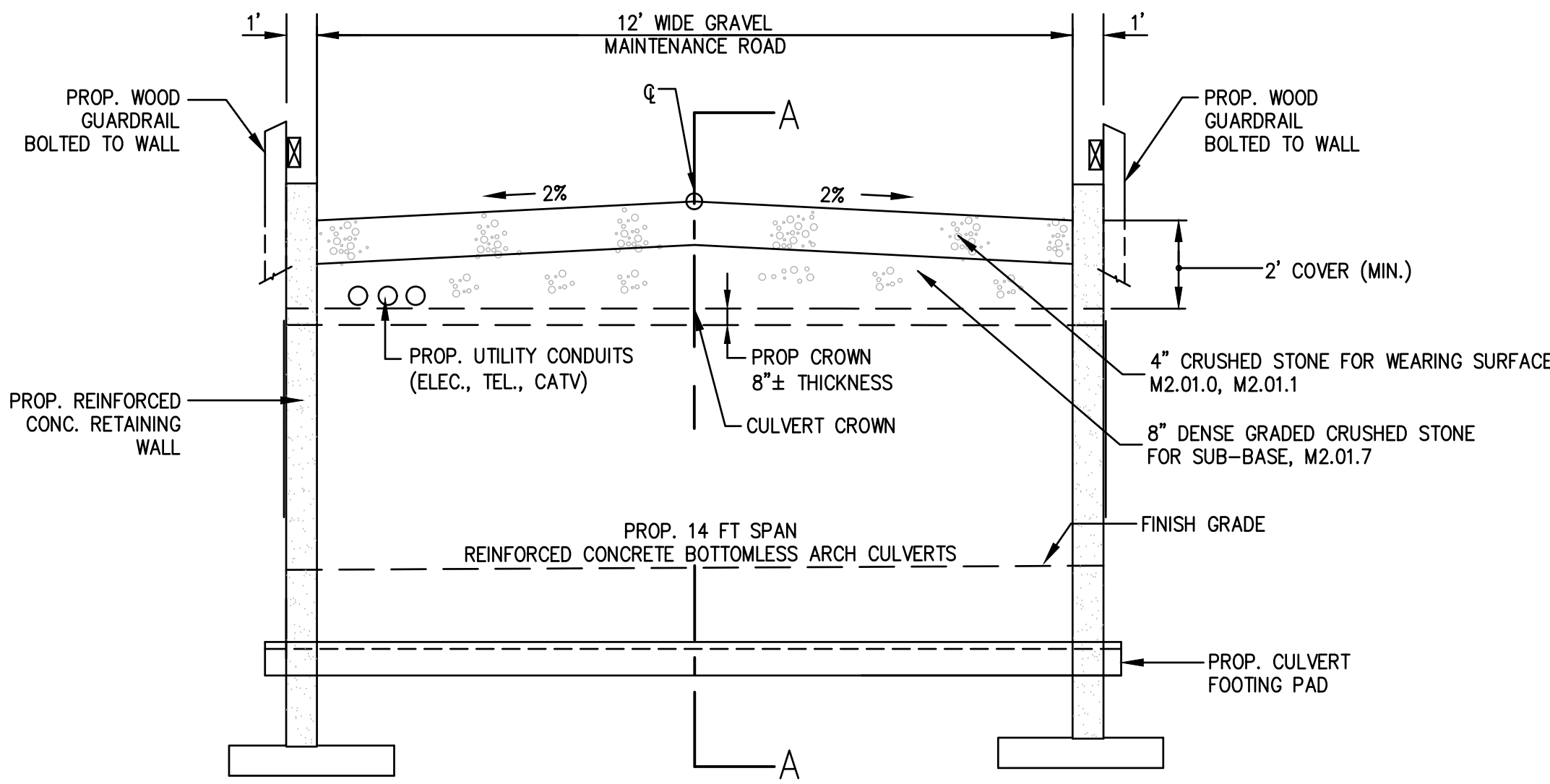
PERMIT PLAN SET

DRAWN BY:	SBS
DESIGNED BY:	SBS
CHECKED BY:	BCM
APPROVED BY:	BCM
DATE:	SEPTEMBER 22, 2016
SCALE:	AS NOTED
PROJECT NO.:	215-181

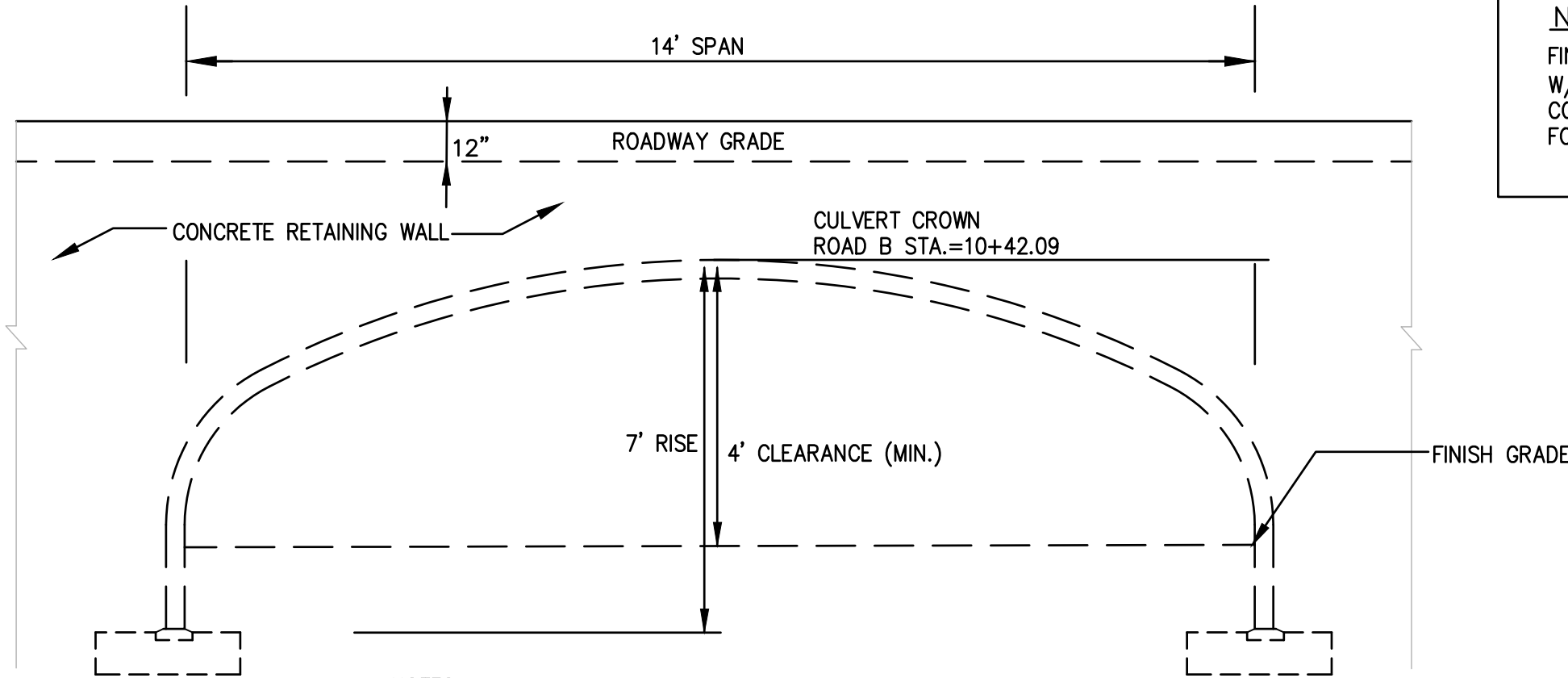
CONSTRUCTION
DETAILS
SHEET 3 OF 4

DWG. NO:

C-6

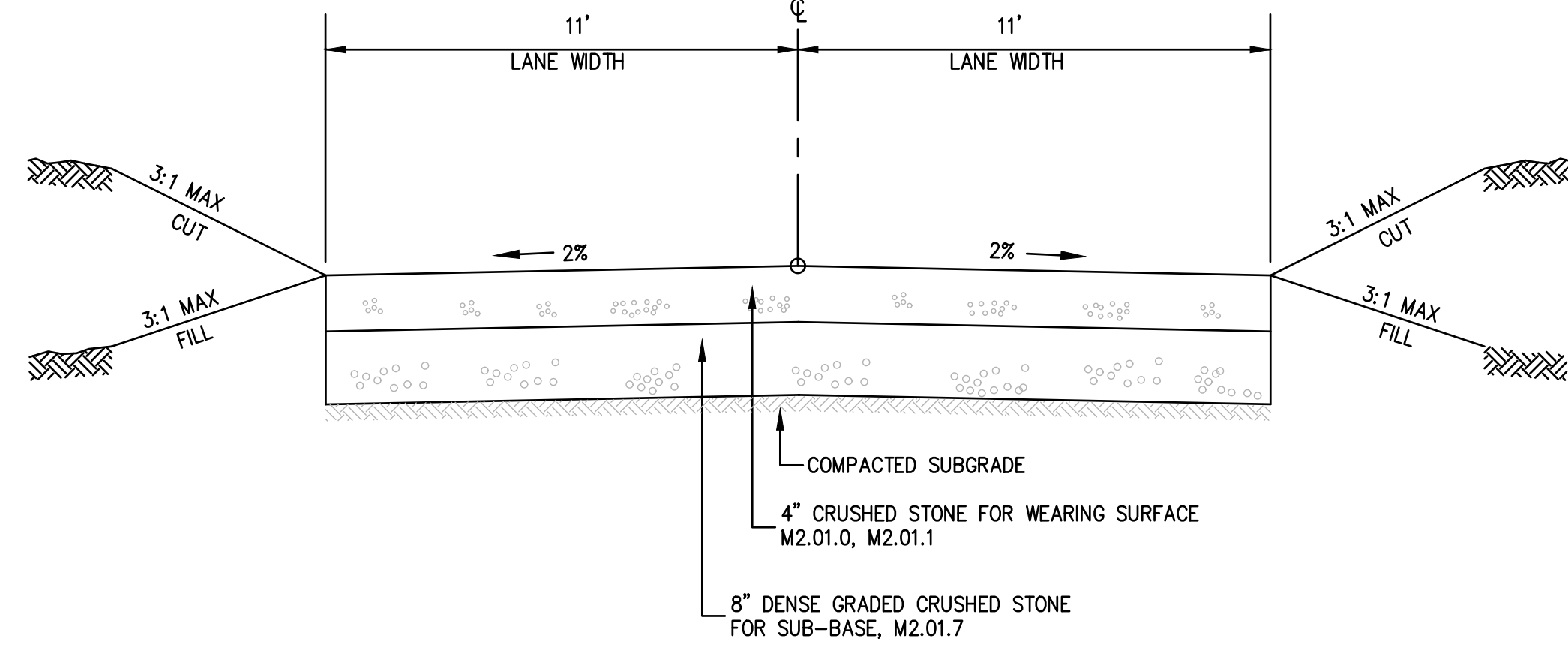


BOTTOMLESS PRECAST CONCRETE ARCH CULVERT
SECTION ROAD B STA 10+42.09
SCALE: N.T.S.



BOTTOMLESS PRECAST CONCRETE ARCH CULVERT SECTION ROAD B STA 10+42.09
SECTION A-A
SCALE: N.T.S.

NOTE:
FINAL DESIGN OF BOTTOMLESS PRECAST CONCRETE BOX CULVERTS W/"LIGHT PORT" TO BE FINALIZED PRIOR TO CONSTRUCTION BY CONSPAN BRIDGE SYSTEMS, INC. DETAILS ON THIS SHEET ARE FOR ILLUSTRATIVE PURPOSES ONLY.



TYPICAL ROADWAY GRAVEL MAINTENANCE ROAD
SCALE: N.T.S.

GENERAL NOTES:

1. PRECAST CONCRETE BOX CULVERTS TO BE MANUFACTURED BY CONSPAN BRIDGE SYSTEMS INC.
2. **BOX CULVERT CONSTRUCTION SEQUENCE**
 - A. EXCAVATE FOOTING AREAS AND PERFORM DEWATERING OPERATIONS TO LOWER THE GROUNDWATER LEVEL AS REQUIRED TO PROVIDE A STABLE, DRY SUBGRADE FOR THE CONSTRUCTION OF THE CULVERT FOOTINGS AND PREVENT SURFACE WATER TO ACCUMULATE IN EXCAVATION AREAS. WATER SHALL BE PUMPED TO A SEDIMENTATION BASIN FOR TREATMENT PRIOR TO DISCHARGING THE METLAND.
 - B. FORM AND POUR CULVERT FOOTINGS.
 - C. INSTALL SECTIONS OF BOX CULVERT AND BACKFILL ROADWAY ENTRANCE AREA.
3. UPON COMPLETION OF CONSTRUCTION ANY DISTURBED SOILS WILL BE REGRADED TO THEIR ORIGINAL ELEVATION AND STABILIZED WITH PLANTINGS AS SHOWN ON THE PLANS AND LOAM AND SEED.
4. ONCE PAVED, THE STRUCTURE IS CAPABLE OF CARRYING HS-20 LIVE LOADS. ANY CONSTRUCTION TRAFFIC LOADING THAT EXCEEDS THIS LEVEL OR IS APPLIED PRIOR TO PAVING MUST BE REVIEWED AND APPROVED BY THE MANUFACTURER.
5. THE CONTRACTOR SHALL PROVIDE SOIL BORINGS IN THE FOOTING LOCATIONS FOR REVIEW AND APPROVAL BY THE MANUFACTURER TO ENSURE PROPER FOOTING SIZING.

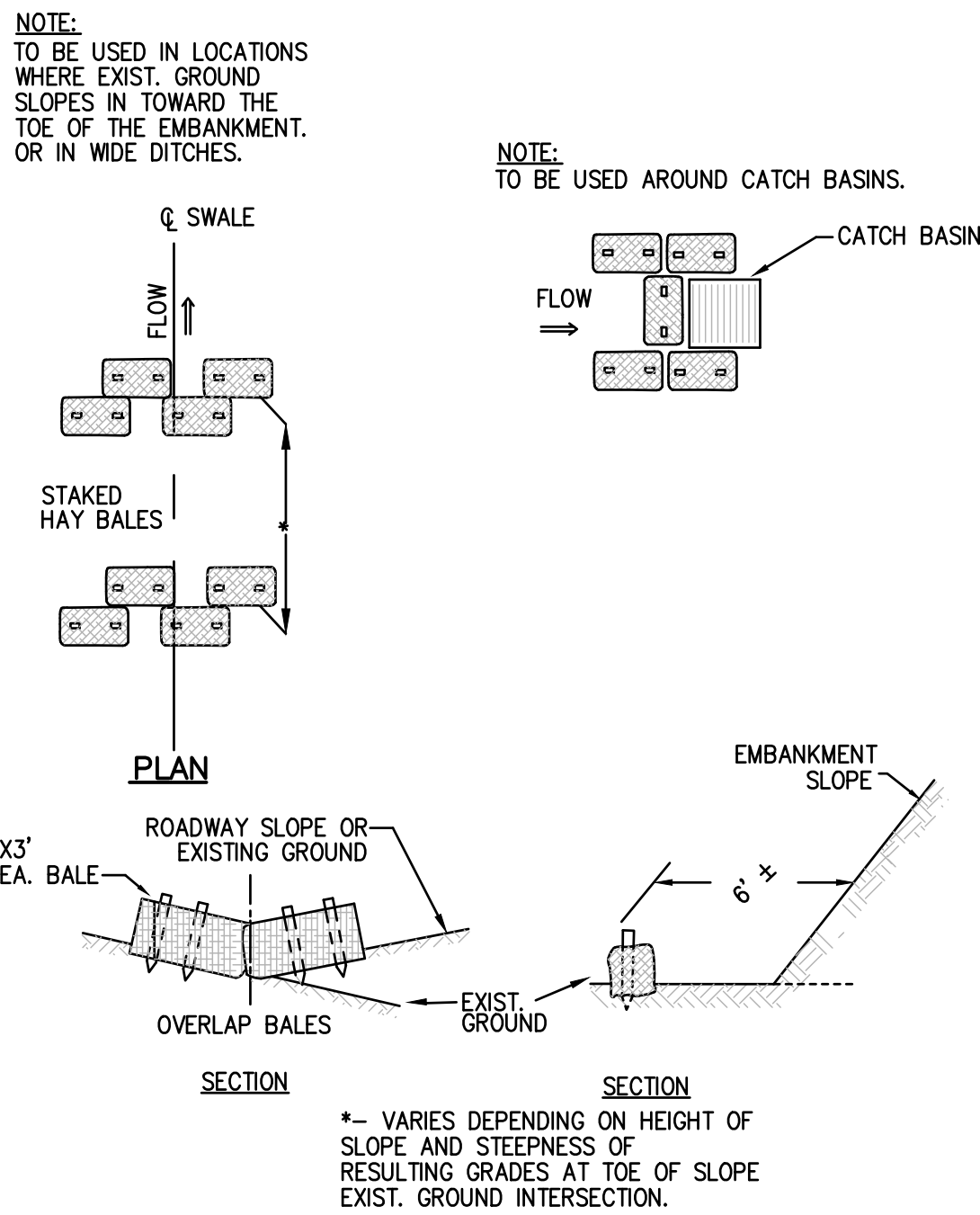
EROSION AND SEDIMENTATION CONTROL

REFER TO CONSTRUCTION PHASE BEST MANAGEMENT PRACTICES AS SPECIFIED IN "BEST MANAGEMENT PRACTICES OPERATION AND MAINTENANCE PLAN" PREPARED BY MCKENZIE ENGINEERING GROUP, INC. FOR STRUCTURAL STABILIZATION AND DUST CONTROL EROSION AND SEDIMENTATION CONTROL MEASURES.

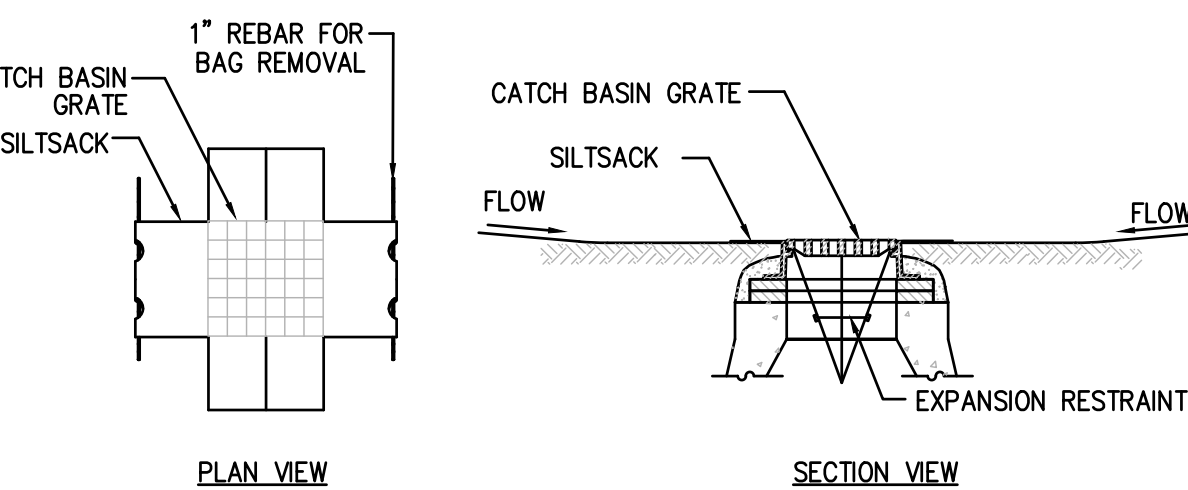
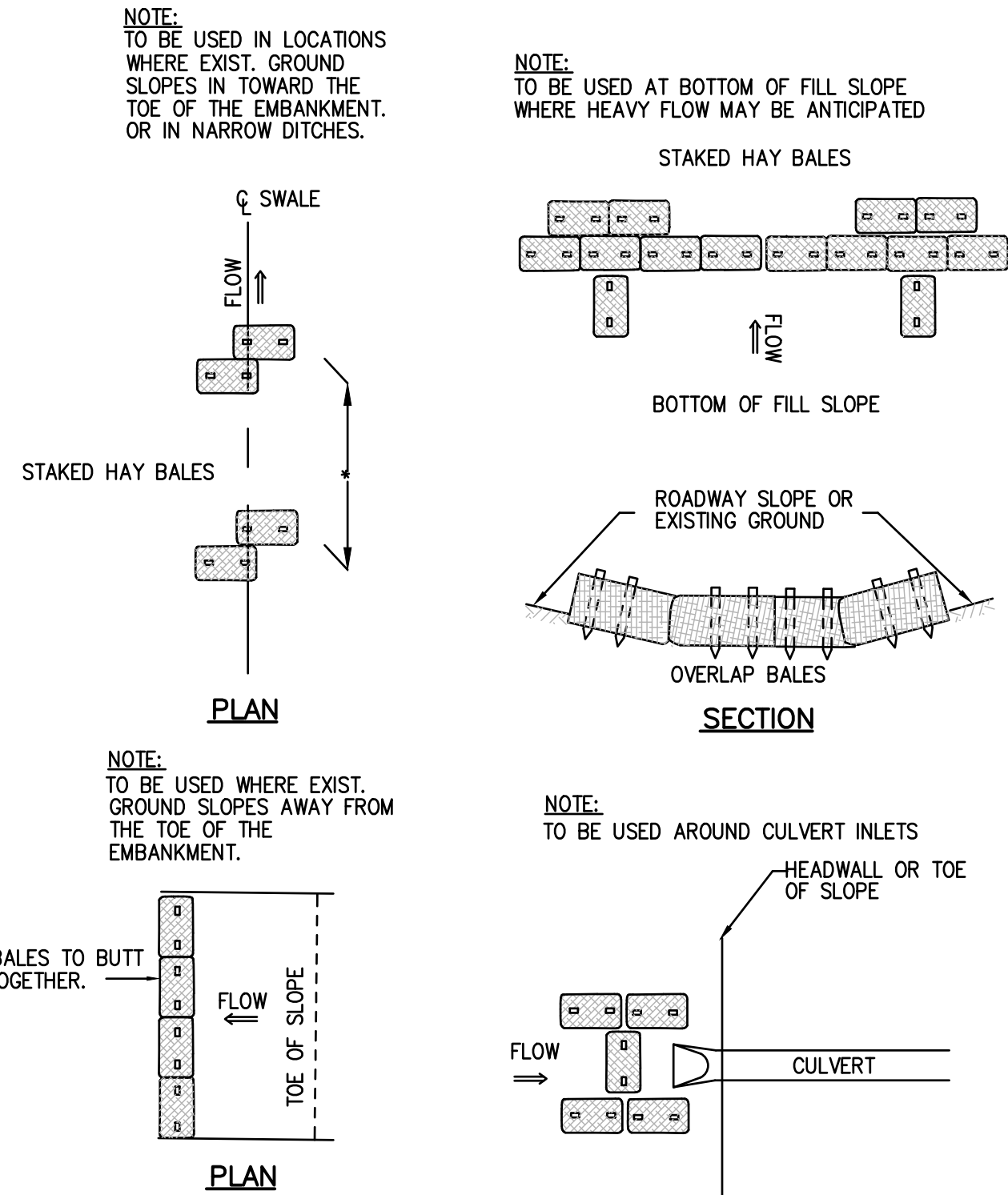
STRUCTURAL PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE SEDIMENT FENCE/HAYBALE BARRIER CONTROLS, STABILIZED CONSTRUCTION ENTRANCE, TEMPORARY DIVERSION SWALES WITH STONE CHECK DAMS, SEDIMENT BASINS, AND INLET PROTECTION SUBJECT TO THE TOWN OF PEMBROKE CONSERVATION COMMISSION APPROVAL.

STABILIZATION PRACTICES UTILIZED FOR THE PROJECT WILL INCLUDE TEMPORARY SEEDING, GEOTEXTILES (JUTE MESH), MULCHING, AND PERMANENT SEEDING.

IN GENERAL, THE SMALLEST POSSIBLE AREA OF LAND SHALL BE EXPOSED AT ONE TIME. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHALL BE CONFINED TO A MAXIMUM PERIOD OF 3 MONTHS. LAND SHALL NOT BE EXPOSED DURING THE WINTER MONTHS. ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY AND THAT WILL BE REGRADED AT A LATER DATE SHALL BE MACHINE HAY MULCHED AND SEEDED WITH WINTER RYE TO PREVENT EROSION.

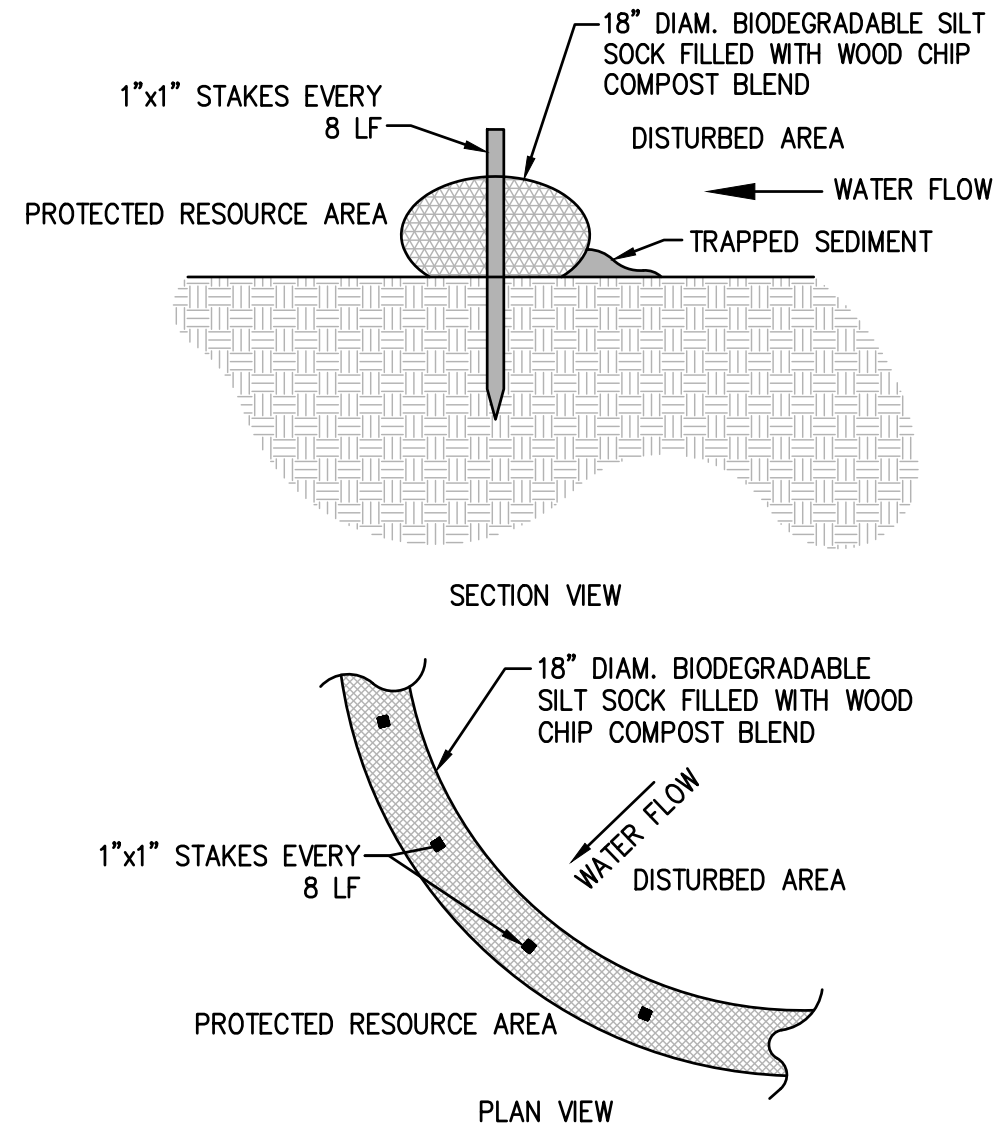


TEMPORARY EROSION CONTROL
SCALE: N.T.S.



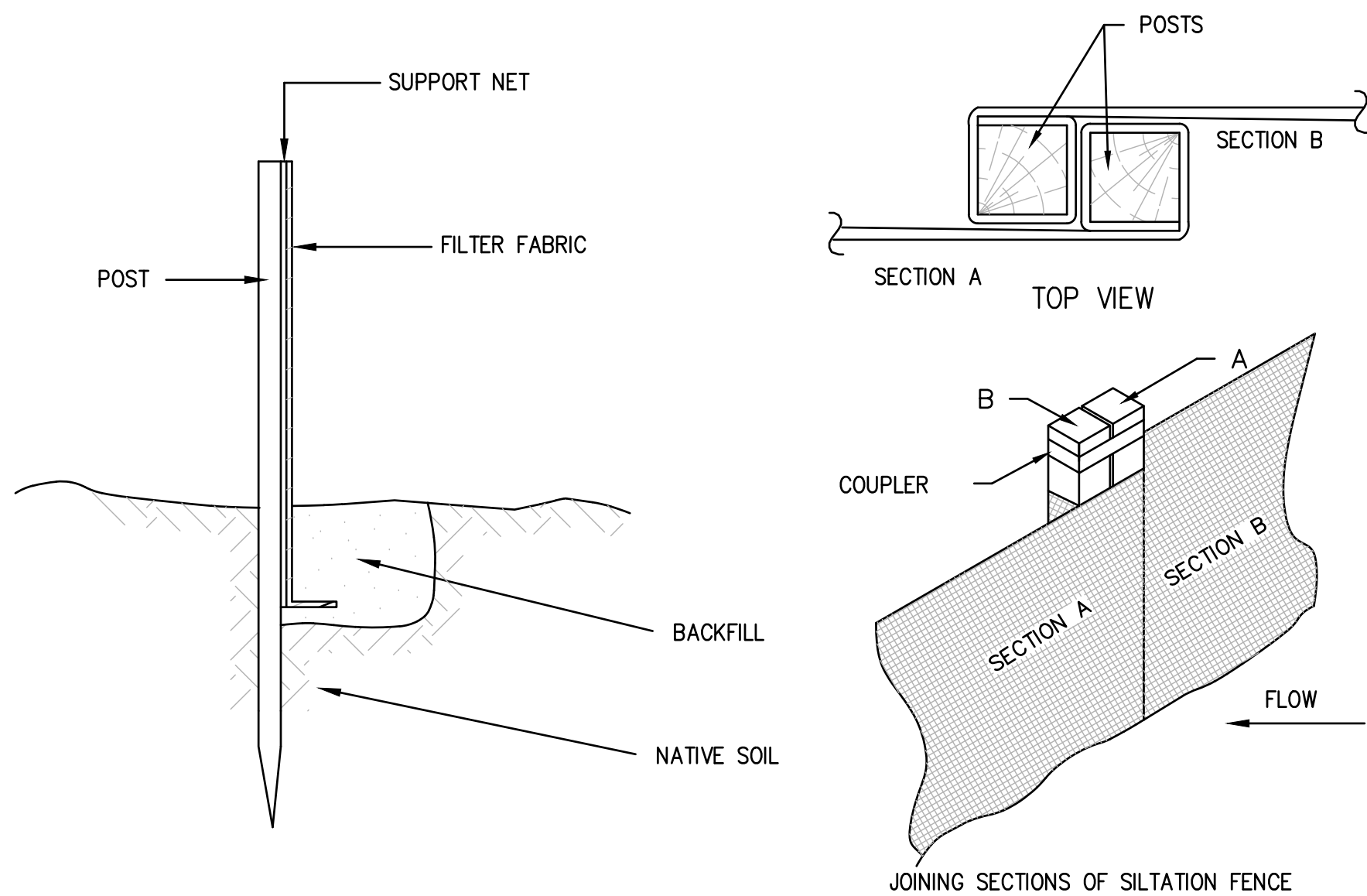
- SILTSACK SEDIMENT TRAP CONSTRUCTION NOTES:**
1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND HAY BALES HAVE BEEN REMOVED.
 2. GRATE TO BE PLACED OVER SILTSACK.
 3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED.

SILTSACK SEDIMENT TRAP
SCALE: N.T.S.



- CONSTRUCTION NOTES:**
1. SILT SOCKS SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING OR LAPPING THE ADJACENT SECTIONS.
 2. SILT SOCKS SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN EVERY 8 LF.
 3. INSPECTION SHALL BE FREQUENT, AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS REQUIRED.
 4. SILT SOCKS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

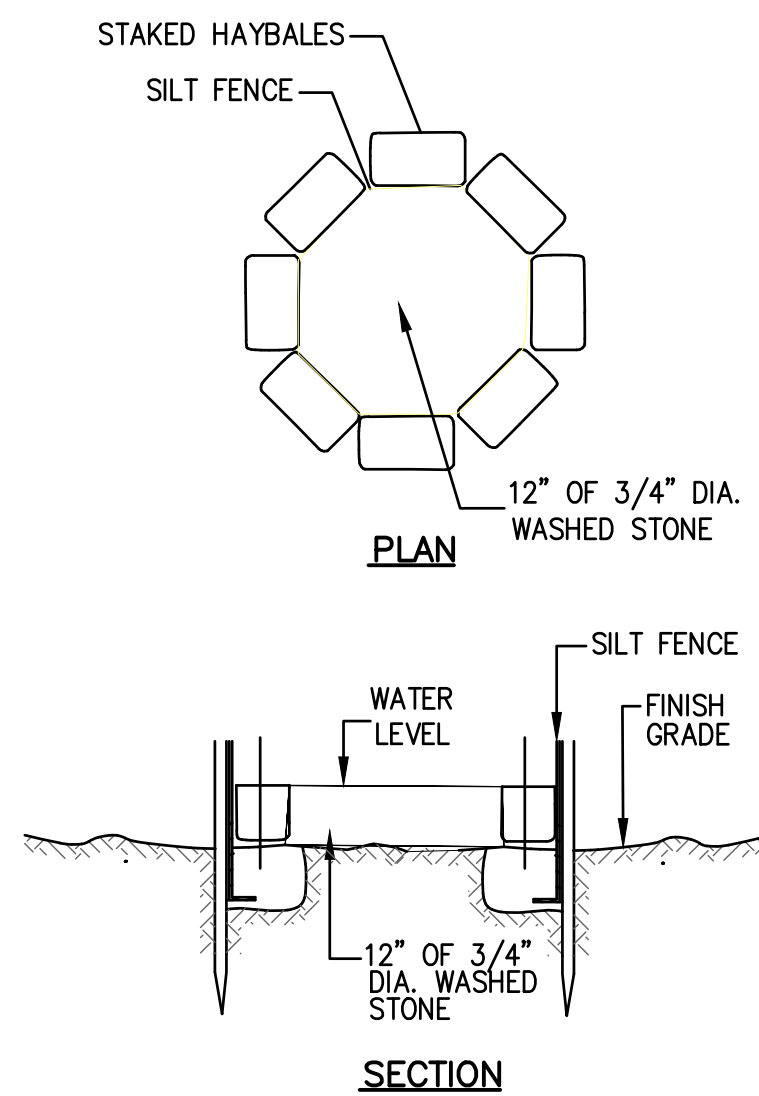
SILTSOCK EROSION CONTROL BARRIER DETAIL
SCALE: N.T.S.



SILTATION FENCE DETAIL
SCALE: N.T.S.

- CONSTRUCTION NOTES:**
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
 2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
 3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES AND FOLDED.
 4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

- CONSTRUCTION NOTES:**
1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
 2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM DEPTH OF 4".
 3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
 4. INSPECTION SHALL BE FREQUENT, AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS REQUIRED.
 5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

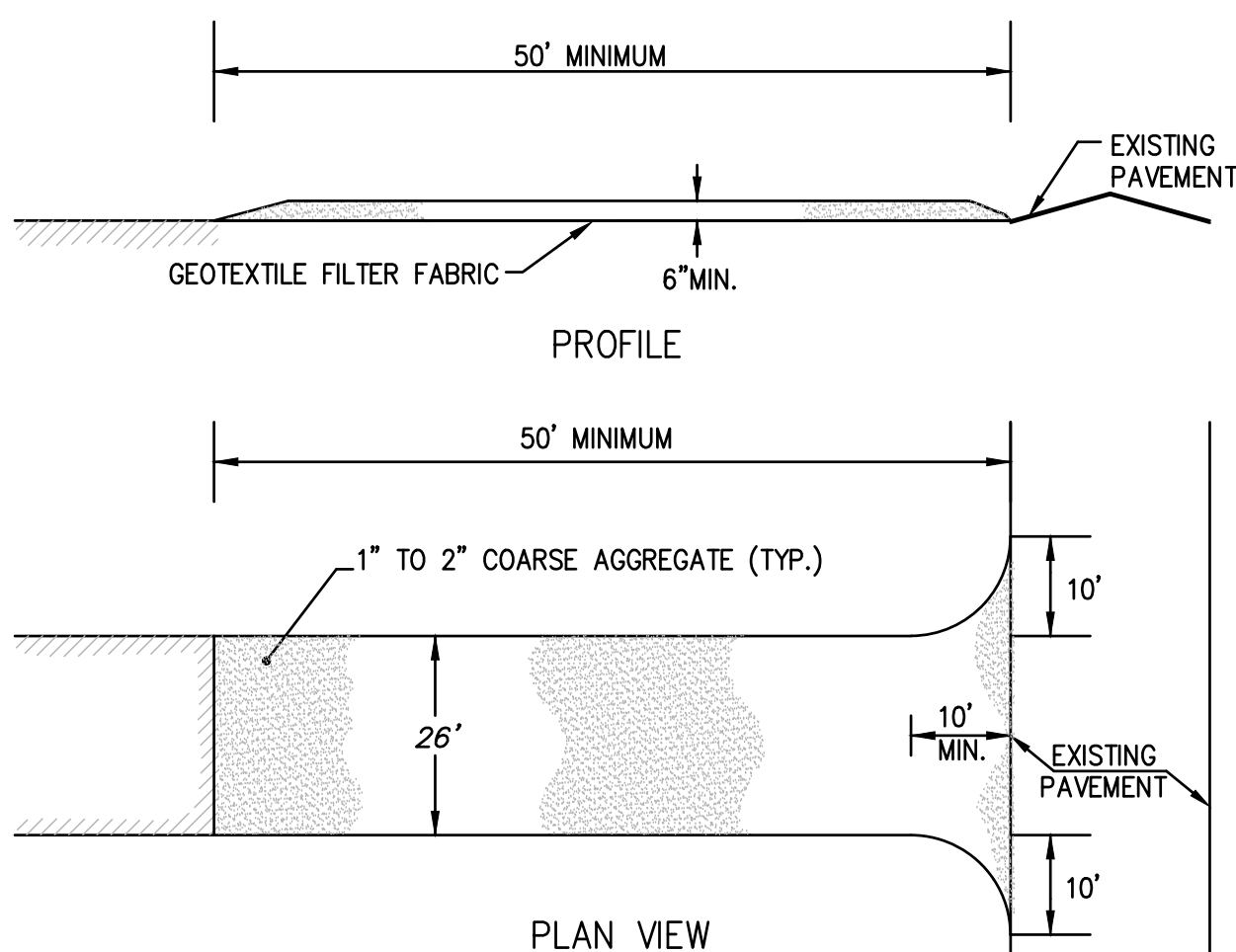


DEWATERING METHODS SHALL BE EMPLOYED IN ANY AREA WHERE PUMPING OF GROUNDWATER IS NECESSARY TO CONSTRUCT THE PROPOSED PARKING LOT AND UTILITIES. DETAILS SHOWN ON THIS PLAN SHALL BE USED AND ANY MODIFICATION SHALL BE APPROVED BY THE TOWN OF PEMBROKE.

DEWATERING FILTER DETAIL
SCALE: N.T.S.

CONSTRUCTION SPECIFICATIONS:

1. STONE FOR A STABILIZATION CONSTRUCTION ENTRANCE SHALL BE 1 TO 2 INCH STONE, RECLAIMED STONE.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, EXCEPT FOR A SINGLE RESIDENTIAL LOT A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THE THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE.
5. ALL SURFACE WATER THAT IS FLOWING TO OR DEVERTED TOWARDS THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOPDRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT, ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.



STABILIZED CONSTRUCTION ENTRANCE DETAIL
SCALE: N.T.S.

RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN (ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274) WATER STREET PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

OWNER/APPLICANT:
RIVER MARSH, LLC
283R WASHINGTON STREET
NORWELL, MASSACHUSETTS 02061

DRAWN BY: SBS
DESIGNED BY: SBS
CHECKED BY: BCM
APPROVED BY: BCM
DATE: SEPTEMBER 22, 2016
SCALE: AS NOTED
PROJECT NO.: 215-181
DWG. TITLE:

**CONSTRUCTION
DETAILS
SHEET 4 OF 4**

DWG. NO: **C-7**

DRAINAGE CALCULATIONS AND STORMWATER MANAGEMENT PLAN

For:

**COMPREHENSIVE PERMIT PLAN
RIVER MARSH VILLAGE
PEMBROKE, MA**

Located:

**0 WATER STREET
(ASSESSOR'S MAP E-17, LOT 0 & E-17A, LOT 274)
PEMBROKE, MASSACHUSETTS**

Submitted to:

TOWN OF PEMBROKE

Prepared For:

**RIVER MARSH, LLC
293R WASHINGTON STREET
NORWELL, MA 02061**

SEPTEMBER 7, 2018



McKenzie Engineering Group, Inc.

150 Longwater Drive, Suite 101, Norwell, Massachusetts 02061

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www.mckeng.com

TABLE OF CONTENTS

1. NARRATIVE	<u>Page</u>
▪ Project Summary	1
▪ Pre-Development Condition	1
▪ Post-Development Condition	3
▪ Figure 1 (USGS Locus Map)	5
▪ Figure 2 (FEMA Flood Map)	6
▪ Figure 3 (SCS Soils Map)	7
 2. APPENDICES	
▪ APPENDIX A: Pre-Development Condition	
▪ APPENDIX B: Post-Development Condition	

**Preliminary Hydrologic Analysis
Comprehensive Permit Plan
River March Village
Pembroke, Massachusetts**

Project Summary

The project proponent River Marsh, LLC, proposes to develop an approximate 49.94-acre parcel of land located at 0 Water Street (Assessor's Map E-17, Lot 0 and E-17A, Lot 274) in Pembroke, Massachusetts. The development is being permitted under MGL Ch. 40B Comprehensive Permit and will consist of 56 condominium units comprised of 3, 4, and 5-unit buildings. The proposed development will involve the construction of approximately 2,422 linear feet of bituminous roadways, residential buildings, driveways, stormwater management system, utilities and other related infrastructure.

The development will be comprised of two parcels which are shown on the Assessor's Map E-17, Lot 0 and E-17A, Lot 274. The site is located between the North River to the west and Water Street, at the intersection of Church Street (Route 139) to the east in Pembroke, Massachusetts. Virtually the entire site is within the Residence "A" Zoning District. Access to the site is from the east off Water Street and through the Business "B" Zoning District. Approximately 10,700 +/- square feet are in the Business "B" Zoning District. Within less than one mile east of the property, is an Industrial Zone 'B' developed area, which abuts Pilgrims Highway (Massachusetts State Route 3). Homes within the immediate area are generally colonial-style, wooded-framed structures. Refer to Figure 1- USGS Locus Map for the location of the parcel.

The project will access utility infrastructure located on Water Street including electric, water, telephone and cable television. The lots will be served by a shared subsurface sewage disposal system with a pump chamber and connections to the municipal water system which will extend from Water Street throughout the proposed development. All stormwater management facilities will be designed provide renovation of stormwater and meet the requirements of the Department of Environment Protection's Stormwater Management Regulations. The existing and proposed site conditions are illustrated on the project *site plans* entitled "River March Village, Comprehensive Permit Plan, Water Street, Pembroke, Massachusetts", prepared by McKenzie Engineering Group, Inc. dated September, 2018.

This report contains preliminary stormwater runoff calculations for the pre-development and post-development conditions and includes the sizing of the proposed low impact drainage system and stormwater best management practices (BMPs).

Pre-Development Condition

The site is located primarily within the Residence "A" Zoning District and is comprised of 22.53 acres of upland and 27.41 acres of wetland. The Pembroke Conservation Commission has confirmed the wetland resource area by issuance of an Order of Resource Area Delineation (ORAD) dated June 3, 2003 for DEP File #SE 56-732. The wetland that was approved under this ORAD, is classified as a tidal wetland. Per the Massachusetts Stormwater Handbook Standard 2 (Reduce Peak Rate Discharge) may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

One single family home currently exists on parcel Map E-17A Lot 274, which is to be retained. The project site is partially wooded and partially cleared with grass cover and wetlands toward the west side of the site approaching the North River. No improvements have been made to the land. The topography of the site is varied with elevations ranging from 30' along the eastern boundary of the parcel of 5' mean sea level (MSL) at the natural riverbank of the North River. Slopes vary from gentle to somewhat steeper grades sloping toward the wetlands on the west side of the site.

Review of available environmental databases such as MassGIS reveals that the site is not located within a mapped Natural Heritage Area, a Zone II or Zone III Groundwater Recharge Area, an Interim Wellhead Protection Area (IWPA), or a Contributing Watershed to Outstanding Resource Water (ORW). Review of the Town of Pembroke's Zoning Map reveals that the site is not located within any other protection area.

The site is within Zone AE (Elevation 8) and Zone X of the Flood Insurance Rate Map, as shown on the current FEMA Flood Insurance Rate Map Panel Nos. 25023C0206J and 25023C0207J with an effective date of July 17, 2012. Refer to Figure 2 – FEMA Flood Map.

The Natural Resources Conservation Service (NRCS) has identified the soil on the site as Scarboro, Ipswich, Squamscott, Eldridge, Hinckley, Merrimac, Windsor and Deerfield soils. The soils range in hydrological soil group classifications from 'A' to 'D'. In addition to the NRCS information, subsurface exploration has been conducted by R.H. Cole & Associate in July of 1992 and September of 1993. The deep observation holes revealed primarily fine to coarse sand (HSG A) throughout the upland areas of the site. Refer to Figure 3 – Soil Map.

The existing watershed analyzed in this report is comprised of approximately 18.5 acres and consists of three (3) sub-catchments. Refer to the Pre-Development Watershed Plan WS-1 in Appendix A for a delineation of drainage subcatchments for the pre-development design condition.

The SCS Technical Release 20 (TR-20) and Technical Release 55 (TR-55) method-based program "HydroCAD" was employed to develop pre- and post-development peak flows. Drainage calculations were prepared for the pre-development condition for the 2, 10, 25 and 100-year, Type III storm events. Refer to Appendix A for computer results, soil characteristics, cover descriptions and times of concentrations for all subareas.

The peak rates of runoff and elevations for this condition are as follows:

Table 1 – Pre-Development Results				
	Design Storm (flow in cfs)			
	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
Design Point	Flow (CFS)	Flow (CFS)	Flow (CFS)	Flow (CFS)
DP-1	0.22	2.57	5.67	13.28
DP-2	0.01	0.15	4.75	1.27

	Design Storm (volume in ac-ft)			
	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
Design Point	Volume (AC-FT)	Volume (AC-FT)	Volume (AC-FT)	Volume (AC-FT)
DP-1	0.129	0.518	0.924	1.733
DP-2	0.006	0.043	0.084	0.169

Post-Development Condition

The proposed development will consist of 56 condominium units comprised of 3, 4, and 5-unit buildings with bituminous concrete access roadways, parking areas and associated infrastructure. Visitor parking will be dispersed throughout the site. Access to the site will be provided by a private 22 ft. wide roadway with two access points from Water Street.

Watershed areas were analyzed in the post-development condition to design low impact stormwater management facilities to mitigate impacts resulting from developing the property. The objective in designing the proposed drainage facilities for the project was to maintain existing drainage patterns to the extent practicable and to ensure that the post-development rates of runoff are less than pre-development rates at the design points.

Refer to the Post-Development Watershed Plan WS-2 in Appendix B for a delineation of post-development drainage subareas. The design points for the post-development design conditions correspond to those analyzed for the pre-development design condition.

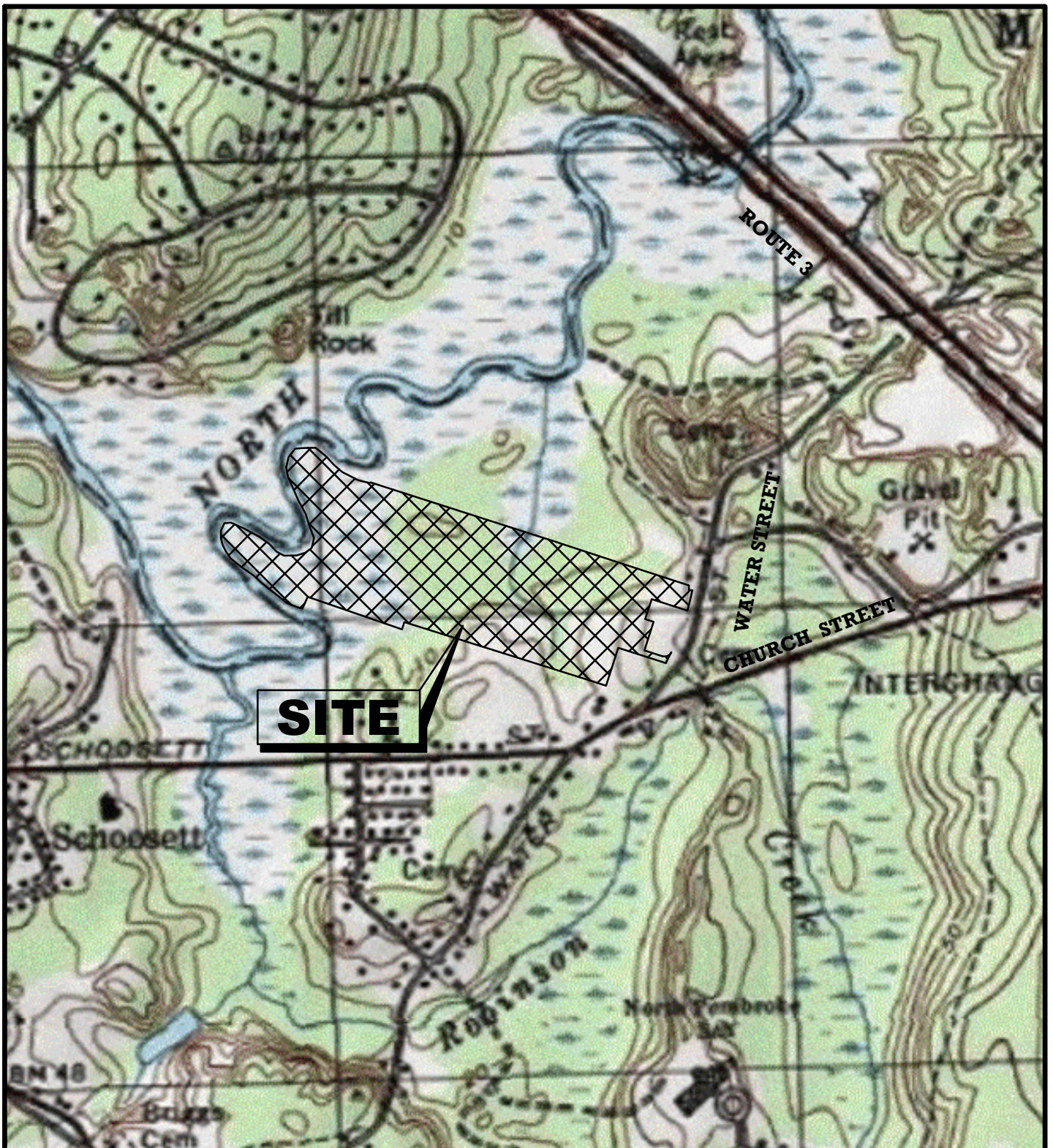
Drainage calculations were prepared by employing the SCS TR-20 Methods for the 2, 10, 25 and 100-year, type III storm events. Refer to Appendix B for computer results. The subsurface infiltration chambers were designed to accommodate peak flows generated by all storms up to and including the 100-year storm event. Refer to site plans for the drainage system design.

The peak rates of runoff and elevations for this condition are as follows:

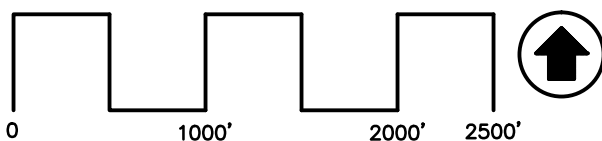
Table 2 – Post-Development Results				
	Design Storm (flow in cfs)			
	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
Design Point	Flow (CFS)	Flow (CFS)	Flow (CFS)	Flow (CFS)
DP-1	0.00	0.43	1.27	3.75
DP-2	0.00	0.00	0.01	0.06

	Design Storm (volume in ac-ft)			
	2-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm
Design Point	Volume (AC-FT)	Volume (AC-FT)	Volume (AC-FT)	Volume (AC-FT)
DP-1	0.000	0.519	1.107	2.174
DP-2	0.000	0.001	0.005	0.014

Although exempt from Standard 2 – Peak Rate Discharges, because discharge is to land subject to coastal storm flowage, a comparison of the pre-development and post-development peak rates of runoff indicate that the peak rates of runoff for the post-development condition at all Design Points will be less than the pre-development condition for all storm events.



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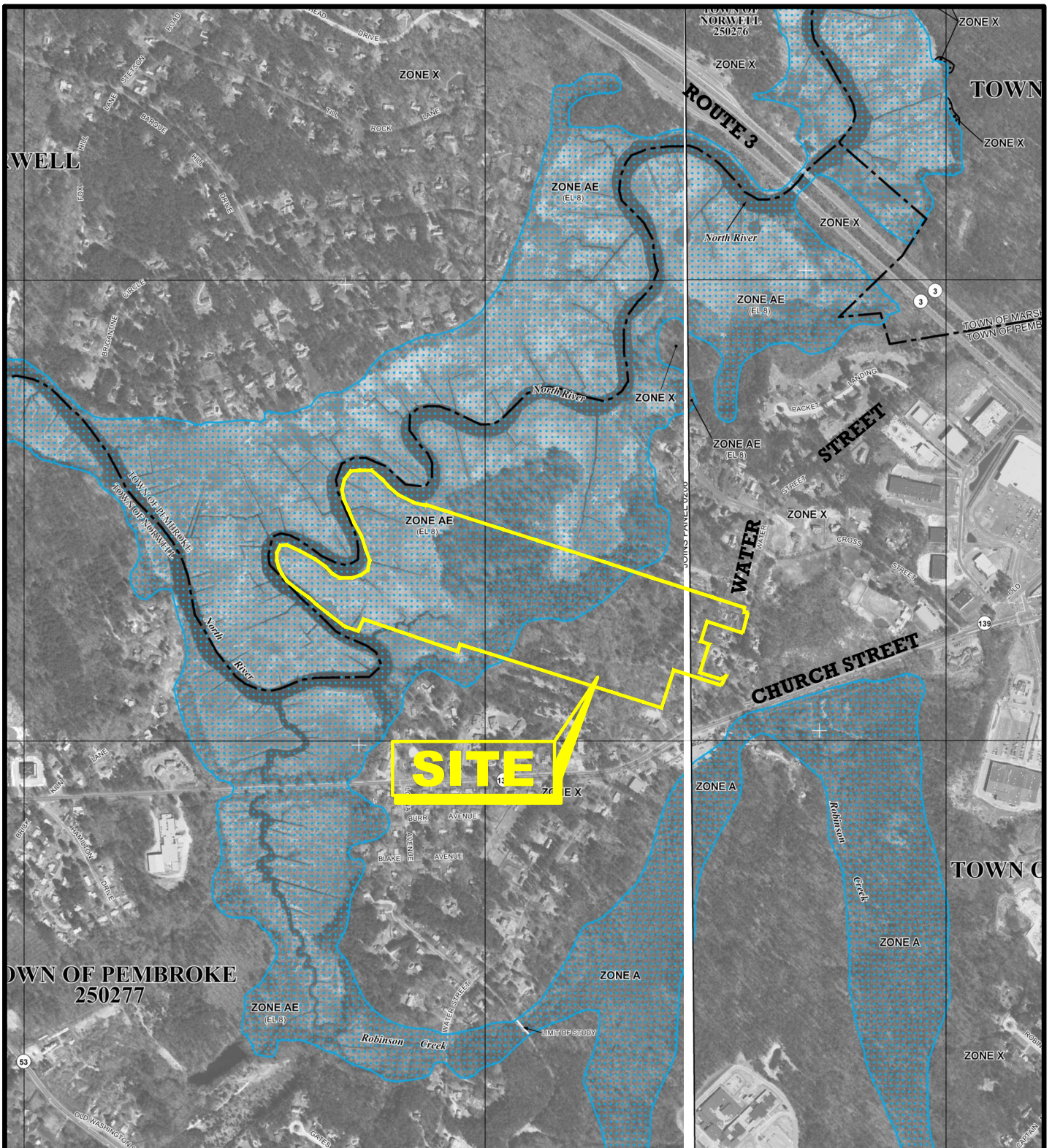
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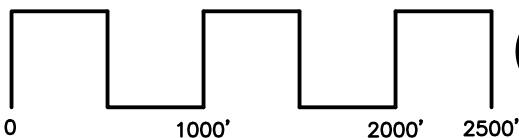
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SGS LOC S MAP

WATER STREET
PEMBROKE, MASSACHUSETTS



☐ IG ☐ RE ☐ ☐



COMMUNIT ☐ PANELS NO: 25023C0206 ☐ 25023C0207 ☐
EFFECTIVE DATE: ☐ JUL ☐ 17, 2012

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☐ EMA ☐ LOO ☐ MAP

WATER STREET
PEMBROKE, MASSACHUSETTS



LEGEND

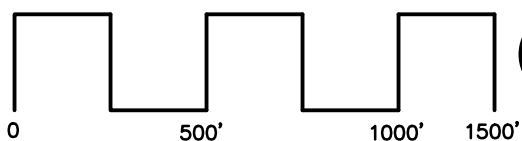
6A	SCARBORO MUCK, COASTAL LOWLAND
66A	IPSWICH-PAWCATUCK-MATUNUCK COMPLEX
200A	SQUAMSCOTT FINE SANDY LOAM
221B	ELDRIDGE FINE SANDY LOAM
253B	HINCKLEY LOAMY SAND
254B	MERRIMAC FINE SANDY LOAM
255B	WINDSOR LOAMY SAND
256A	DEERFIELD FINE SAND
607	WATER, SALINE

NAME

HSG HYDROLOGIC

D
D
A/D
C/D
A
A
A
B

IG RE



PLMOUTH COUNTY, MASSACHUSETTS
SOIL SURVEY



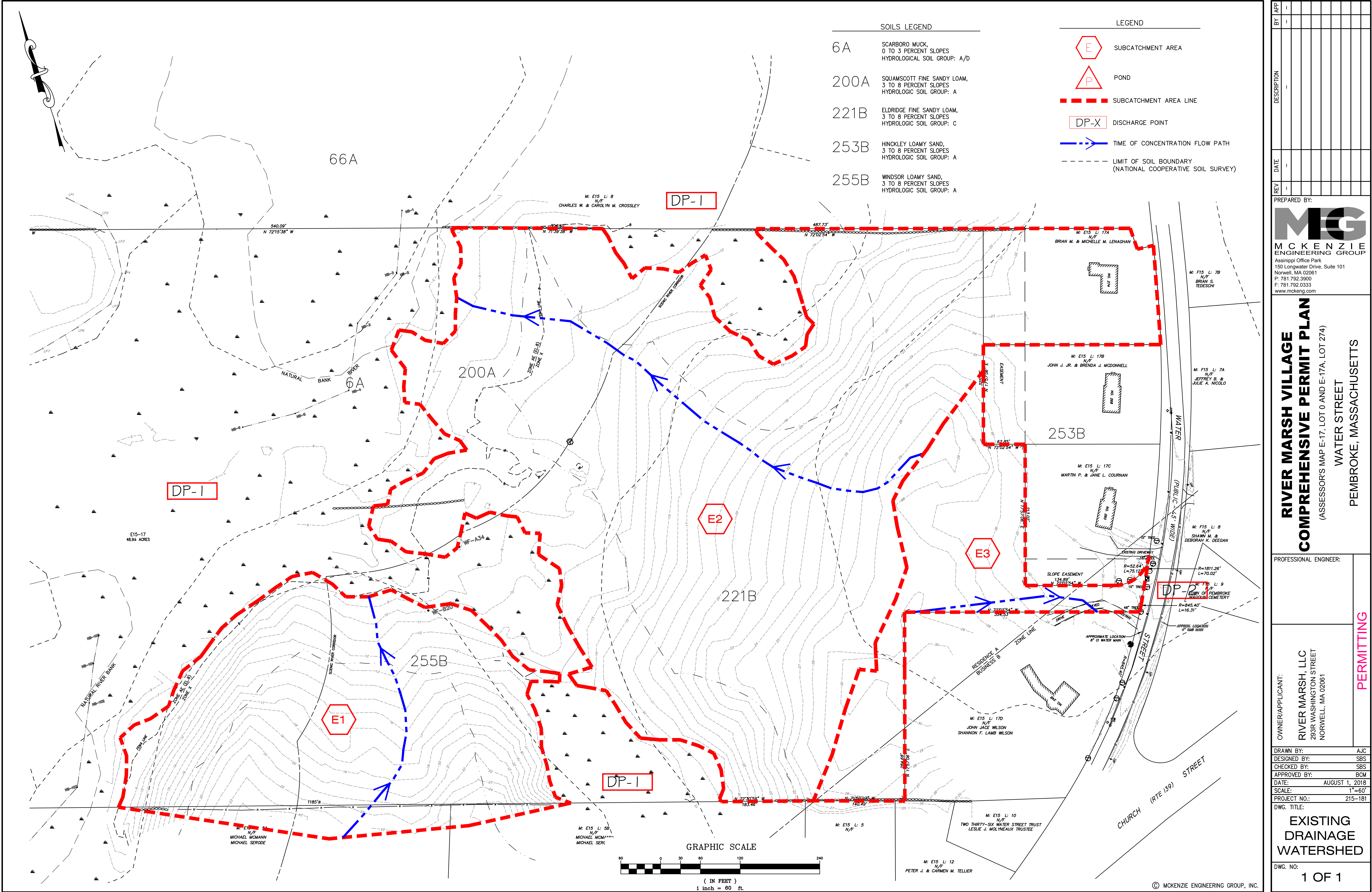
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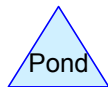
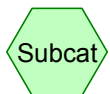
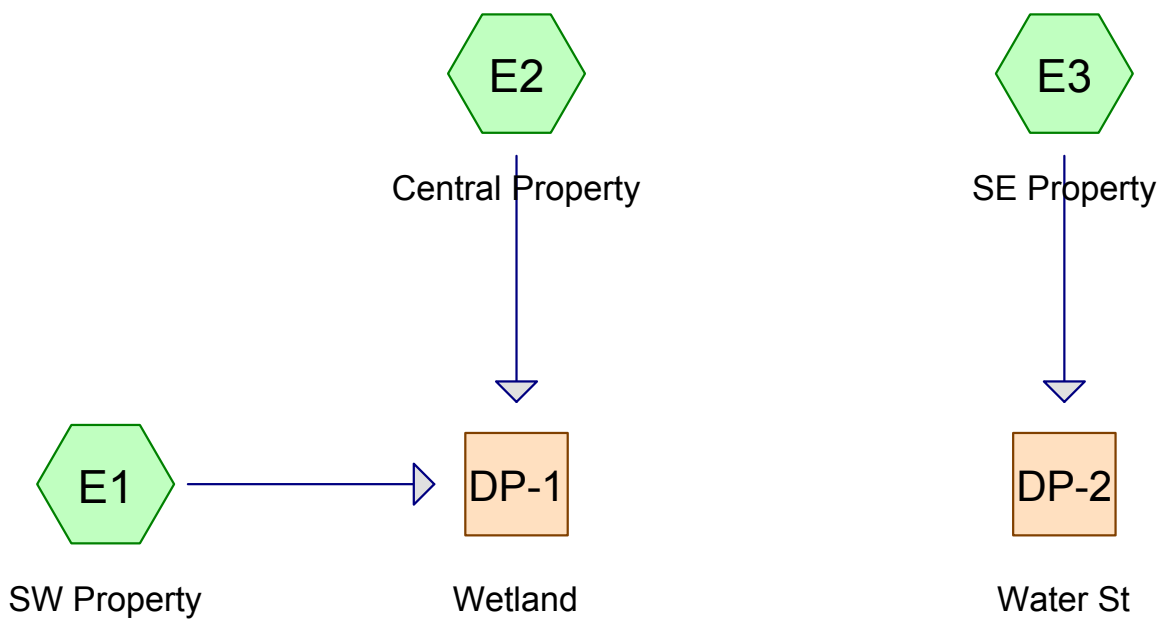
SOIL MAP

WATER STREET
PEMBROKE, MASSACHUSETTS

A P P E N D I X A

Pre-Development Condition





215-181 PRE-DEV

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.270	49	50-75% Grass cover, Fair, HSG A (E3)
0.018	98	Paved parking, HSG A (E3)
4.362	36	Woods, Fair, HSG A (E1)
7.986	30	Woods, Good, HSG A (E2, E3)
5.922	70	Woods, Good, HSG C (E2, E3)
18.558	45	TOTAL AREA

215-181 PRE-DEV

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
12.636	HSG A	E1, E2, E3
0.000	HSG B	
5.922	HSG C	E2, E3
0.000	HSG D	
0.000	Other	
18.558		TOTAL AREA

215-181 PRE-DEV

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.270	0.000	0.000	0.000	0.000	0.270	50-75% Grass cover, Fair	E3
0.018	0.000	0.000	0.000	0.000	0.018	Paved parking	E3
4.362	0.000	0.000	0.000	0.000	4.362	Woods, Fair	E1
7.986	0.000	5.922	0.000	0.000	13.908	Woods, Good	E2, E3
12.636	0.000	5.922	0.000	0.000	18.558	TOTAL AREA	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: SW Property

Runoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=406' Tc=12.0 min CN=36 Runoff=0.00 cfs 0.000 af

SubcatchmentE2: Central Property

Runoff Area=536,132 sf 0.00% Impervious Runoff Depth=0.13"
Flow Length=808' Tc=17.9 min CN=48 Runoff=0.22 cfs 0.129 af

SubcatchmentE3: SE Property

Runoff Area=82,214 sf 0.94% Impervious Runoff Depth=0.04"
Flow Length=290' Tc=13.3 min CN=43 Runoff=0.01 cfs 0.006 af

Reach DP-1: Wetland

Inflow=0.22 cfs 0.129 af
Outflow=0.22 cfs 0.129 af

Reach DP-2: Water St

Inflow=0.01 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Total Runoff Area = 18.558 ac Runoff Volume = 0.136 af Average Runoff Depth = 0.09"
99.90% Pervious = 18.540 ac 0.10% Impervious = 0.018 ac

Summary for Subcatchment E1: SW Property

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

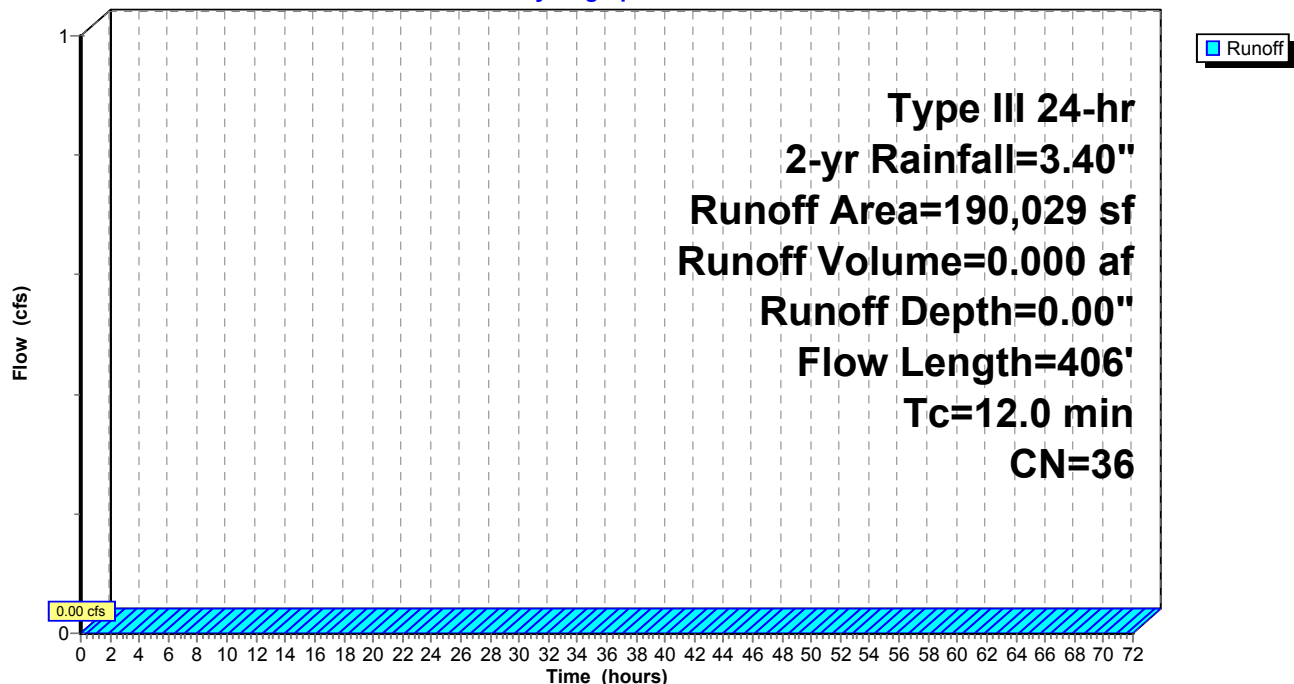
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
190,029	36	Woods, Fair, HSG A
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	356	0.0400	3.22		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	406	Total			

Subcatchment E1: SW Property

Hydrograph



Summary for Subcatchment E2: Central Property

Runoff = 0.22 cfs @ 13.77 hrs, Volume= 0.129 af, Depth= 0.13"

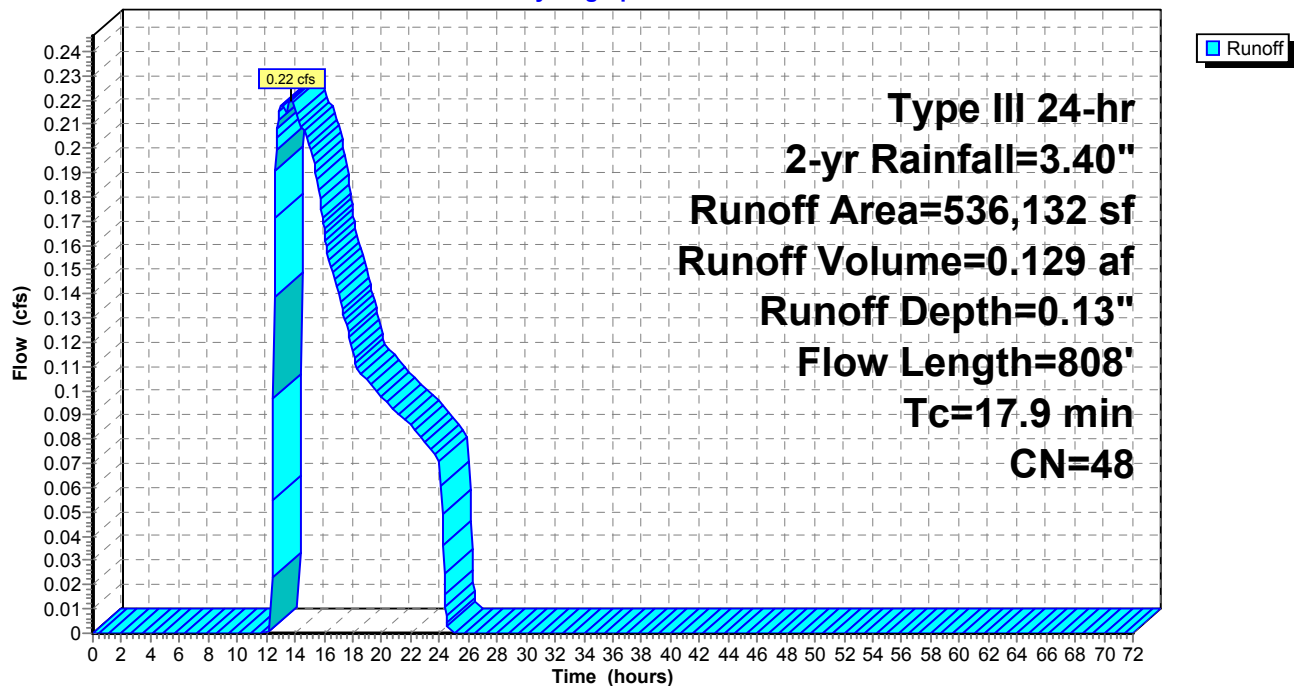
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
299,040	30	Woods, Good, HSG A
237,092	70	Woods, Good, HSG C
536,132	48	Weighted Average
536,132		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	50	0.0150	0.06		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	758	0.0310	2.83		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.9	808	Total			

Subcatchment E2: Central Property

Hydrograph



Summary for Subcatchment E3: SE Property

Runoff = 0.01 cfs @ 15.62 hrs, Volume= 0.006 af, Depth= 0.04"

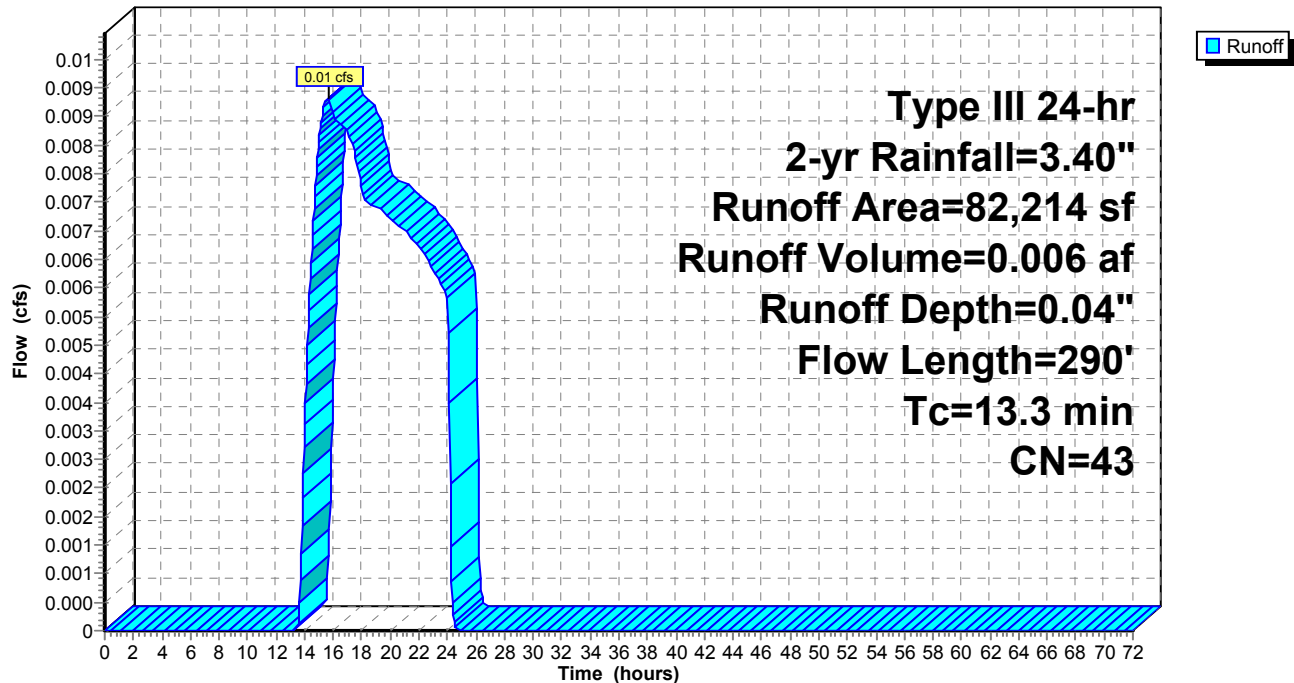
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
48,838	30	Woods, Good, HSG A
20,856	70	Woods, Good, HSG C
11,750	49	50-75% Grass cover, Fair, HSG A
770	98	Paved parking, HSG A
82,214	43	Weighted Average
81,444		99.06% Pervious Area
770		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment E3: SE Property

Hydrograph



Summary for Reach DP-1: Wetland

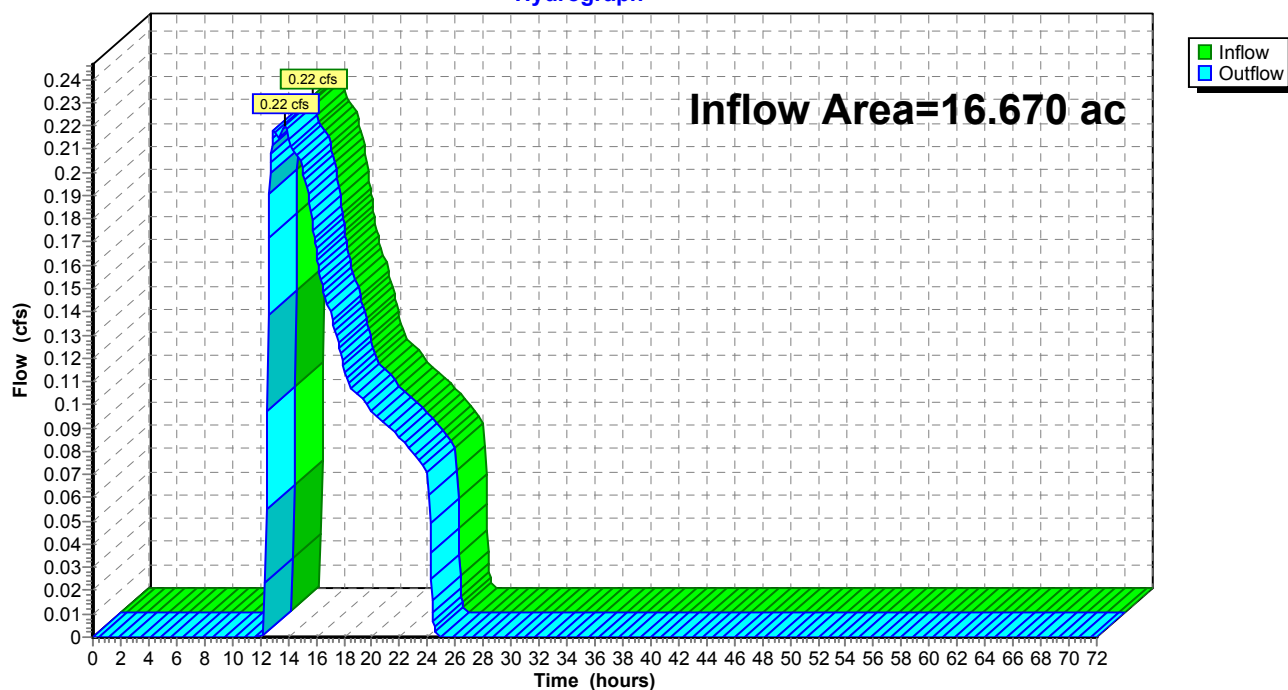
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.670 ac, 0.00% Impervious, Inflow Depth = 0.09" for 2-yr event
Inflow = 0.22 cfs @ 13.77 hrs, Volume= 0.129 af
Outflow = 0.22 cfs @ 13.77 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland

Hydrograph

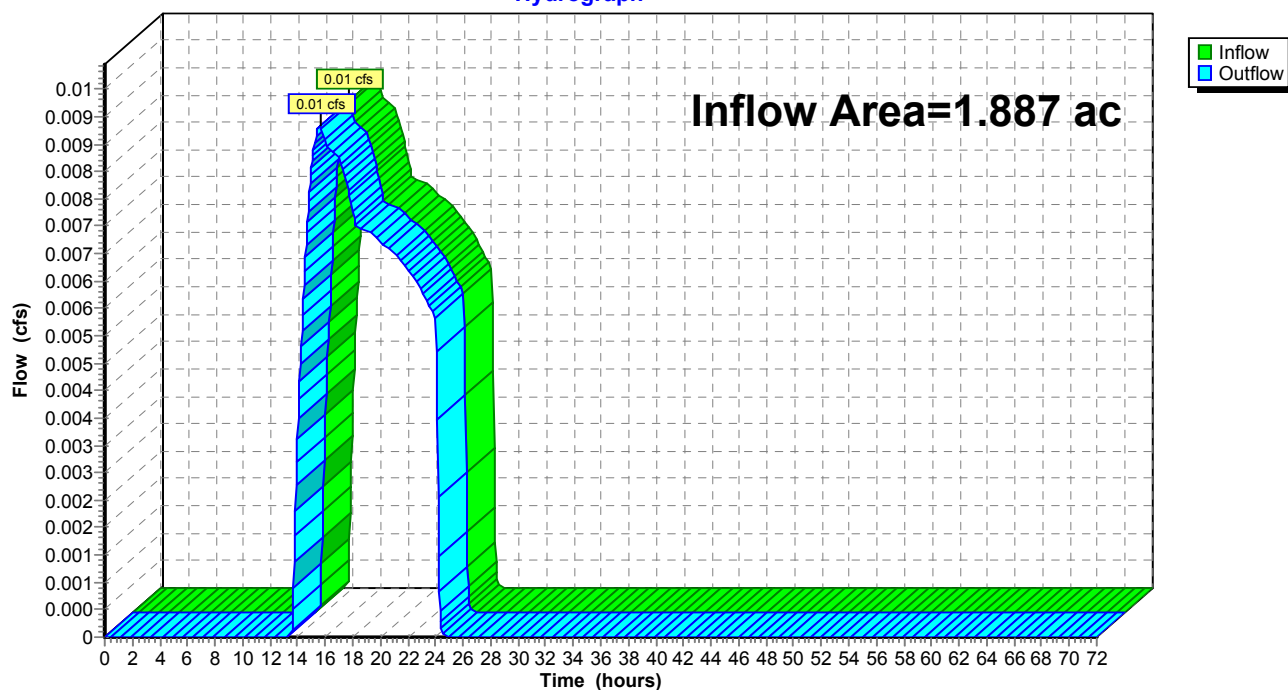


Summary for Reach DP-2: Water St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.887 ac, 0.94% Impervious, Inflow Depth = 0.04" for 2-yr event
Inflow = 0.01 cfs @ 15.62 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 15.62 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St**Hydrograph**

215-181 PRE-DEV*Type III 24-hr 10-yr Rainfall=4.70"*

Prepared by McKenzie Engineering Group, Inc.

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Page 11

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: SW PropertyRunoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=406' Tc=12.0 min CN=36 Runoff=0.04 cfs 0.025 af**SubcatchmentE2: Central Property**Runoff Area=536,132 sf 0.00% Impervious Runoff Depth=0.48"
Flow Length=808' Tc=17.9 min CN=48 Runoff=2.57 cfs 0.492 af**SubcatchmentE3: SE Property**Runoff Area=82,214 sf 0.94% Impervious Runoff Depth=0.27"
Flow Length=290' Tc=13.3 min CN=43 Runoff=0.15 cfs 0.043 af**Reach DP-1: Wetland**Inflow=2.57 cfs 0.518 af
Outflow=2.57 cfs 0.518 af**Reach DP-2: Water St**Inflow=0.15 cfs 0.043 af
Outflow=0.15 cfs 0.043 af**Total Runoff Area = 18.558 ac Runoff Volume = 0.561 af Average Runoff Depth = 0.36"**
99.90% Pervious = 18.540 ac 0.10% Impervious = 0.018 ac

Summary for Subcatchment E1: SW Property

Runoff = 0.04 cfs @ 15.37 hrs, Volume= 0.025 af, Depth= 0.07"

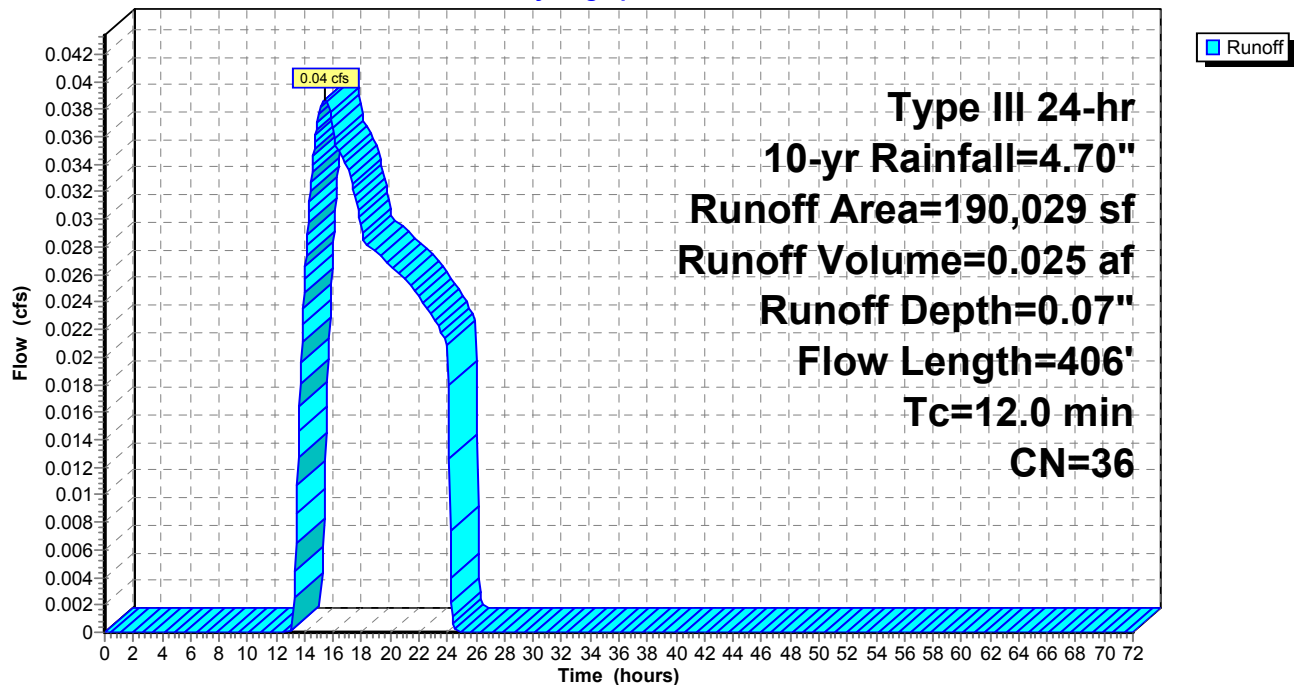
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
190,029	36	Woods, Fair, HSG A
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	356	0.0400	3.22		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	406	Total			

Subcatchment E1: SW Property

Hydrograph



Summary for Subcatchment E2: Central Property

Runoff = 2.57 cfs @ 12.46 hrs, Volume= 0.492 af, Depth= 0.48"

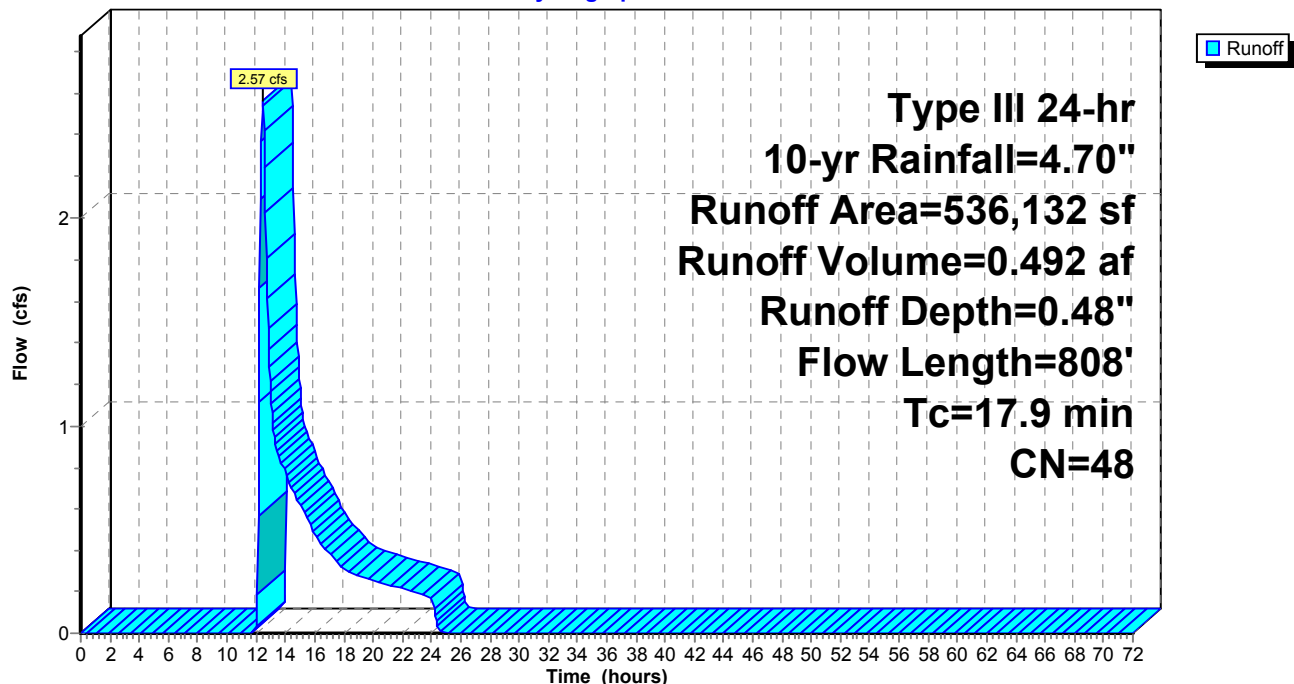
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
299,040	30	Woods, Good, HSG A
237,092	70	Woods, Good, HSG C
536,132	48	Weighted Average
536,132		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	50	0.0150	0.06		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	758	0.0310	2.83		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.9	808	Total			

Subcatchment E2: Central Property

Hydrograph



Summary for Subcatchment E3: SE Property

Runoff = 0.15 cfs @ 12.51 hrs, Volume= 0.043 af, Depth= 0.27"

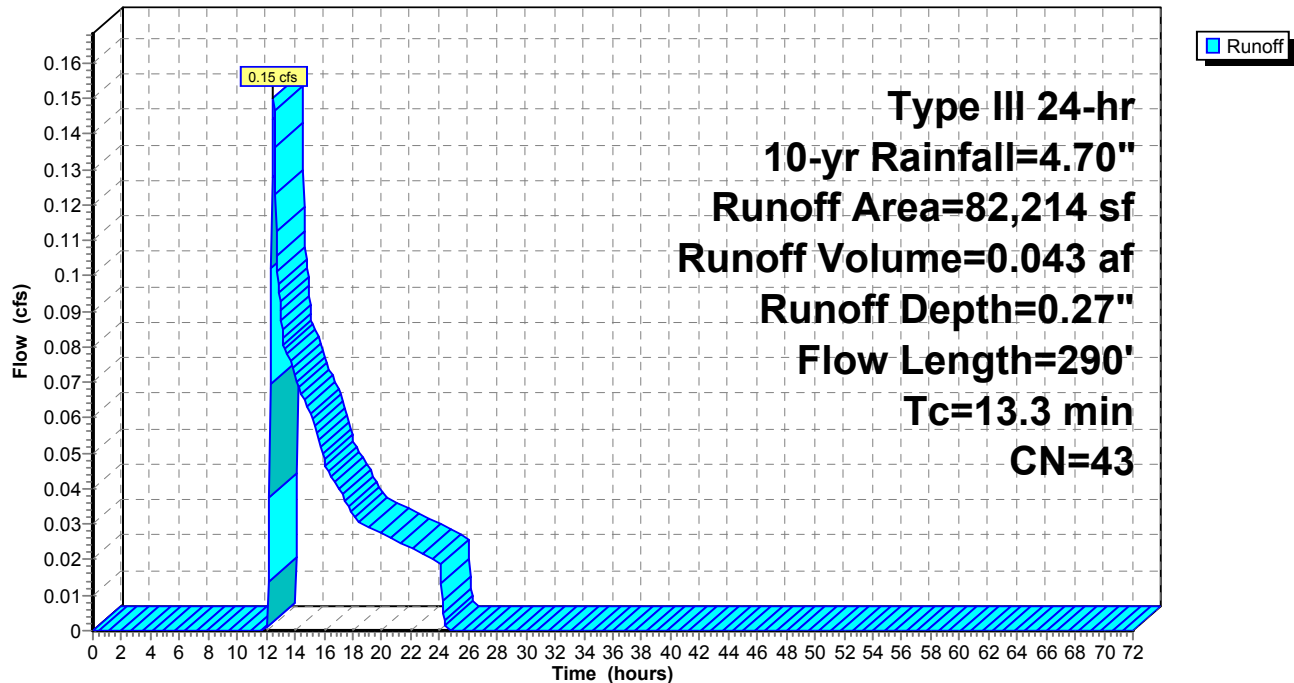
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
48,838	30	Woods, Good, HSG A
20,856	70	Woods, Good, HSG C
11,750	49	50-75% Grass cover, Fair, HSG A
770	98	Paved parking, HSG A
82,214	43	Weighted Average
81,444		99.06% Pervious Area
770		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment E3: SE Property

Hydrograph



Summary for Reach DP-1: Wetland

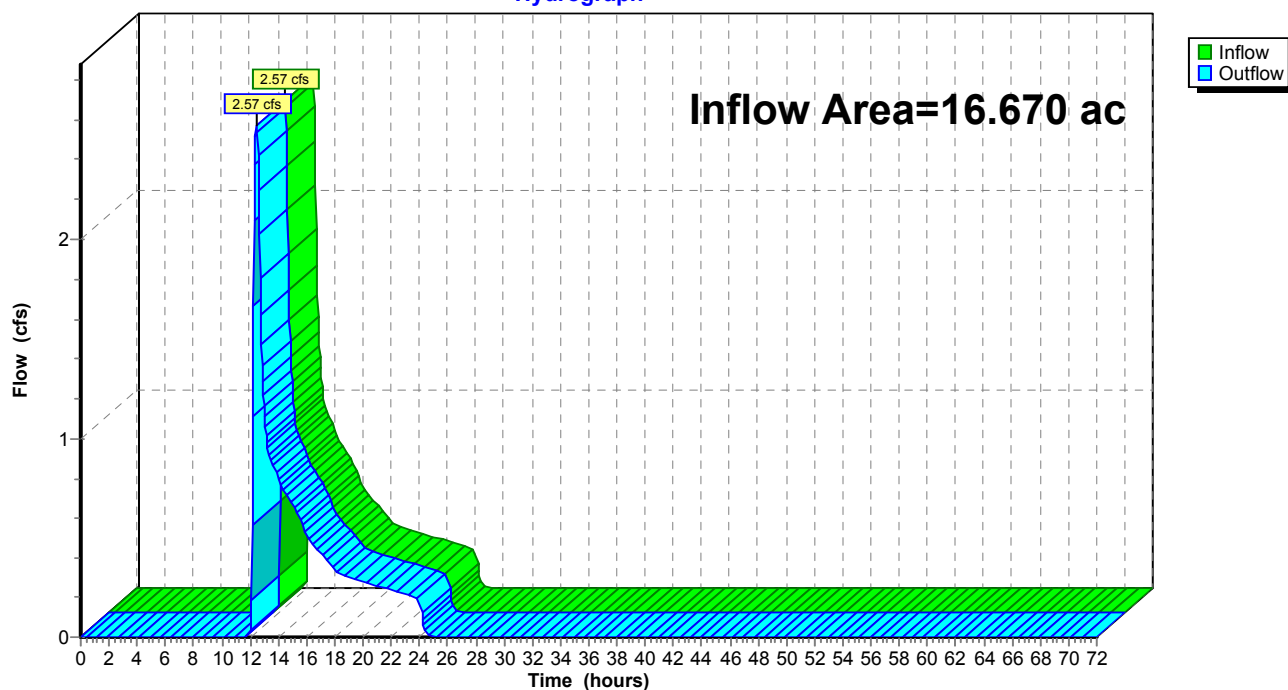
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.670 ac, 0.00% Impervious, Inflow Depth = 0.37" for 10-yr event
Inflow = 2.57 cfs @ 12.46 hrs, Volume= 0.518 af
Outflow = 2.57 cfs @ 12.46 hrs, Volume= 0.518 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland

Hydrograph

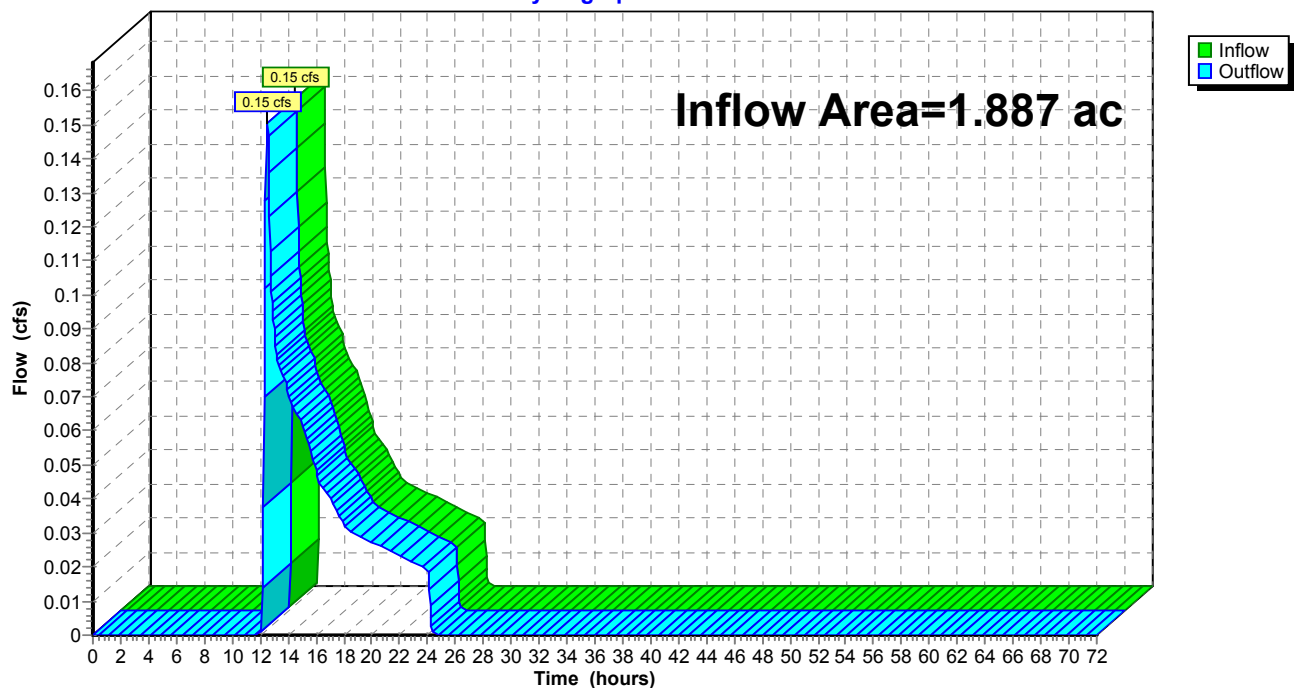


Summary for Reach DP-2: Water St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.887 ac, 0.94% Impervious, Inflow Depth = 0.27" for 10-yr event
Inflow = 0.15 cfs @ 12.51 hrs, Volume= 0.043 af
Outflow = 0.15 cfs @ 12.51 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St**Hydrograph**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: SW Property

Runoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.21"
Flow Length=406' Tc=12.0 min CN=36 Runoff=0.13 cfs 0.077 af

SubcatchmentE2: Central Property

Runoff Area=536,132 sf 0.00% Impervious Runoff Depth=0.83"
Flow Length=808' Tc=17.9 min CN=48 Runoff=5.65 cfs 0.847 af

SubcatchmentE3: SE Property

Runoff Area=82,214 sf 0.94% Impervious Runoff Depth=0.54"
Flow Length=290' Tc=13.3 min CN=43 Runoff=0.45 cfs 0.084 af

Reach DP-1: Wetland

Inflow=5.67 cfs 0.924 af
Outflow=5.67 cfs 0.924 af

Reach DP-2: Water St

Inflow=0.45 cfs 0.084 af
Outflow=0.45 cfs 0.084 af

Total Runoff Area = 18.558 ac Runoff Volume = 1.009 af Average Runoff Depth = 0.65"
99.90% Pervious = 18.540 ac 0.10% Impervious = 0.018 ac

Summary for Subcatchment E1: SW Property

Runoff = 0.13 cfs @ 12.61 hrs, Volume= 0.077 af, Depth= 0.21"

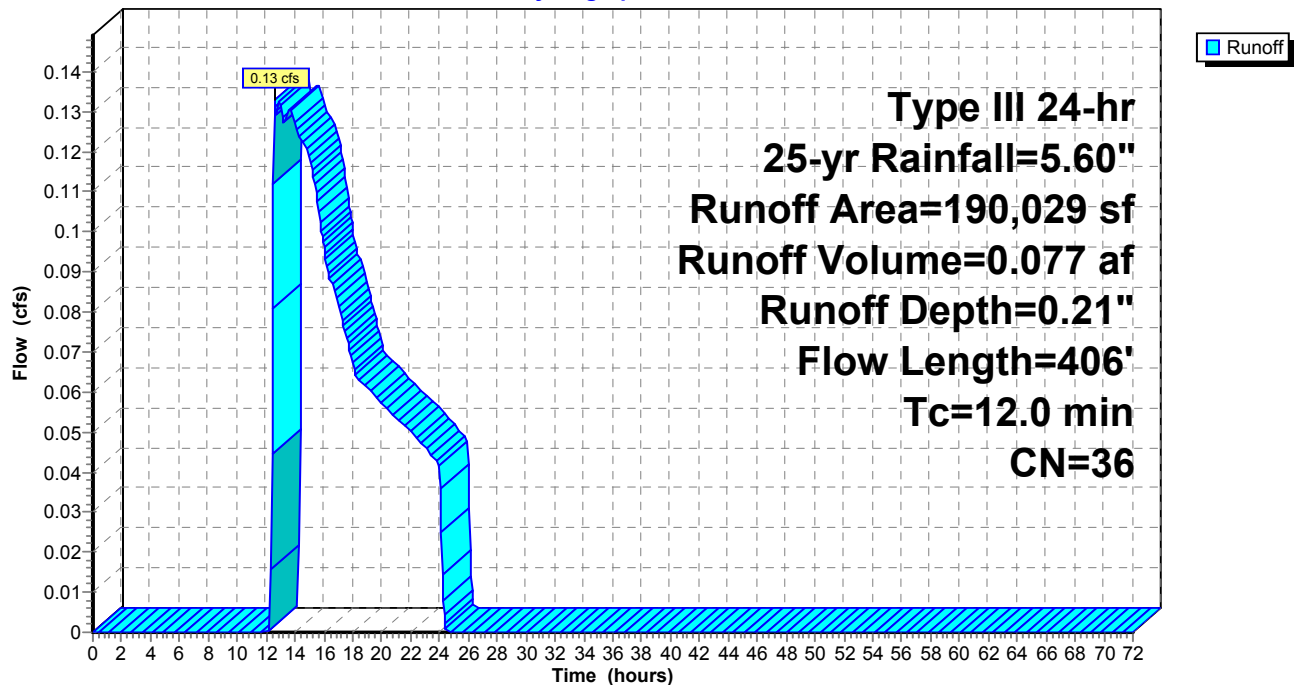
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
190,029	36	Woods, Fair, HSG A
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	356	0.0400	3.22		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	406	Total			

Subcatchment E1: SW Property

Hydrograph



Summary for Subcatchment E2: Central Property

Runoff = 5.65 cfs @ 12.35 hrs, Volume= 0.847 af, Depth= 0.83"

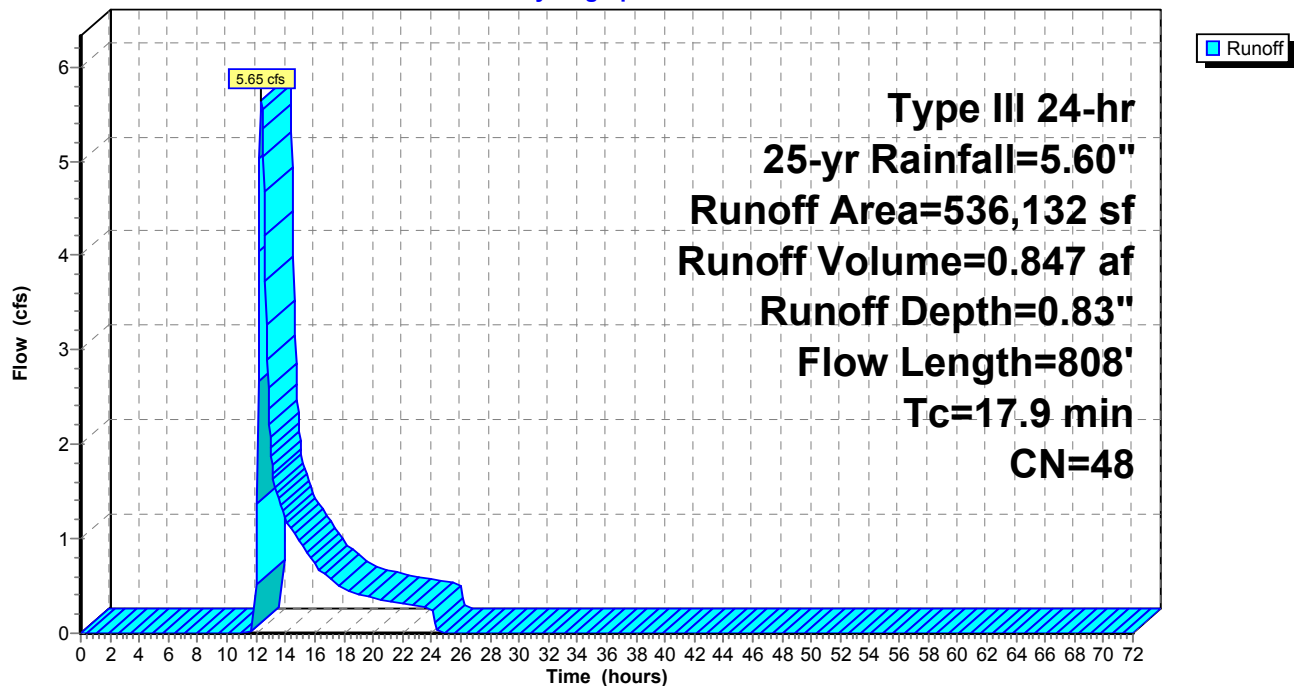
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
299,040	30	Woods, Good, HSG A
237,092	70	Woods, Good, HSG C
536,132	48	Weighted Average
536,132		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	50	0.0150	0.06		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	758	0.0310	2.83		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.9	808	Total			

Subcatchment E2: Central Property

Hydrograph



Summary for Subcatchment E3: SE Property

Runoff = 0.45 cfs @ 12.40 hrs, Volume= 0.084 af, Depth= 0.54"

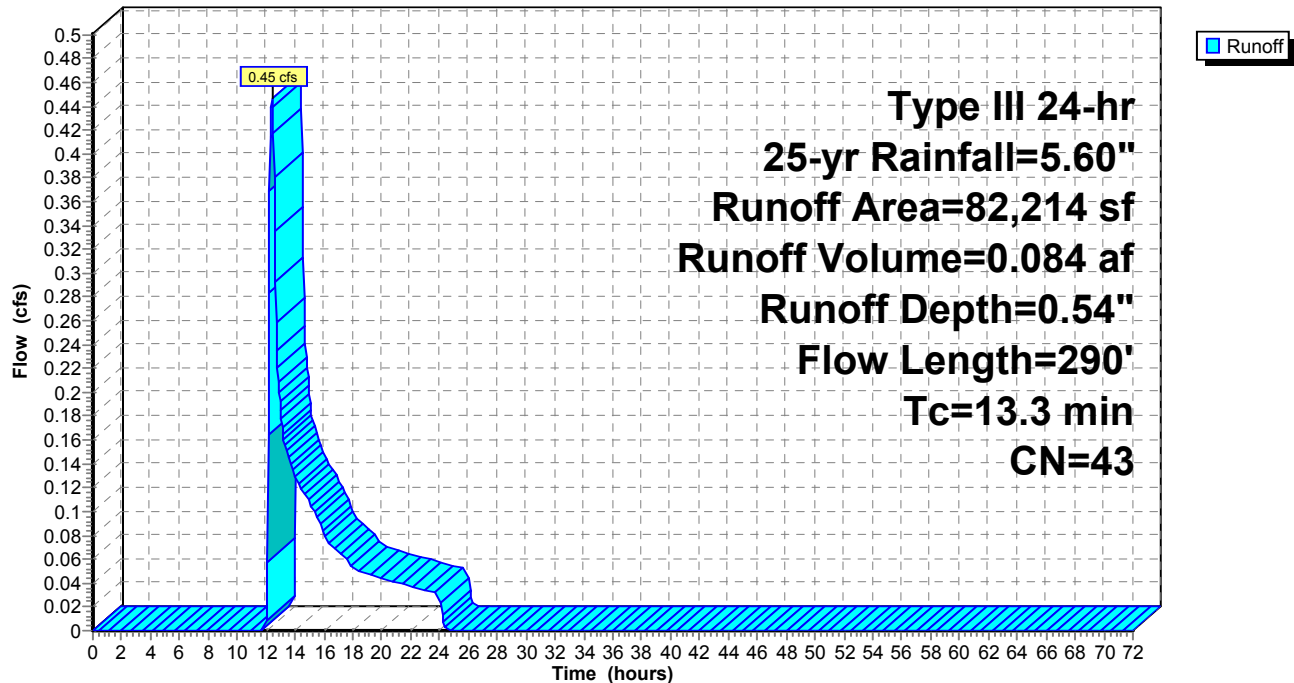
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
48,838	30	Woods, Good, HSG A
20,856	70	Woods, Good, HSG C
11,750	49	50-75% Grass cover, Fair, HSG A
770	98	Paved parking, HSG A
82,214	43	Weighted Average
81,444		99.06% Pervious Area
770		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment E3: SE Property

Hydrograph

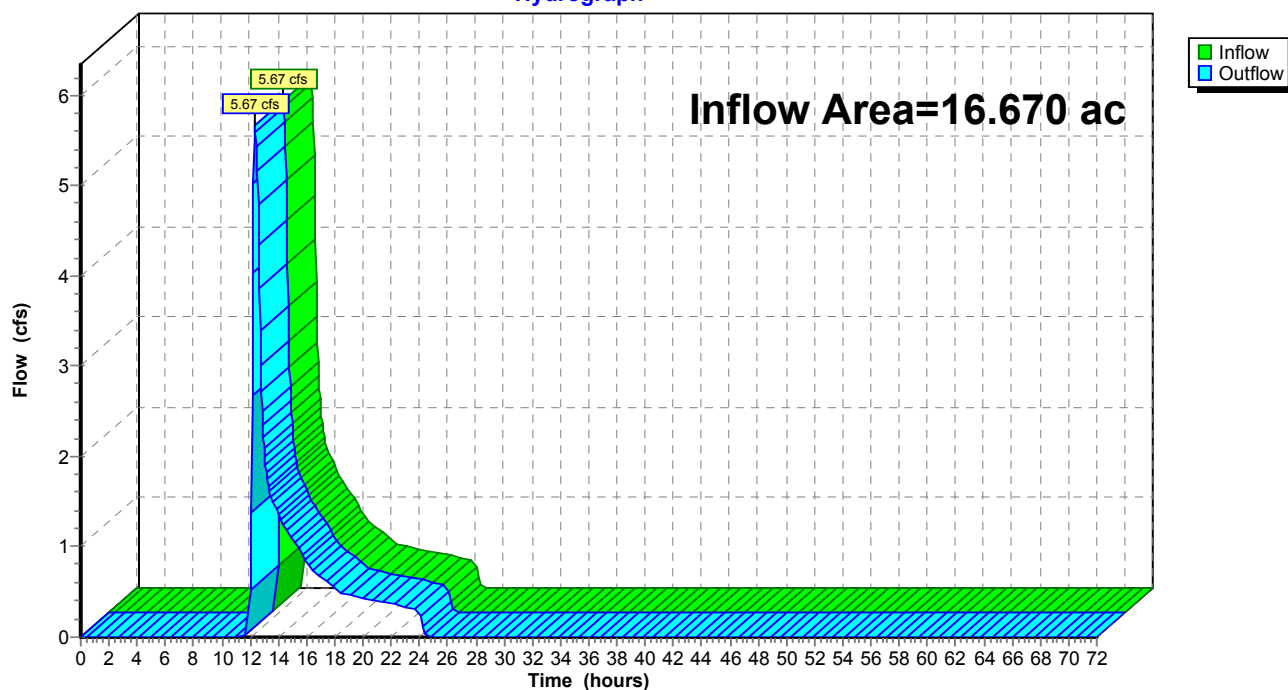


Summary for Reach DP-1: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.670 ac, 0.00% Impervious, Inflow Depth = 0.67" for 25-yr event
Inflow = 5.67 cfs @ 12.36 hrs, Volume= 0.924 af
Outflow = 5.67 cfs @ 12.36 hrs, Volume= 0.924 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland**Hydrograph**

Summary for Reach DP-2: Water St

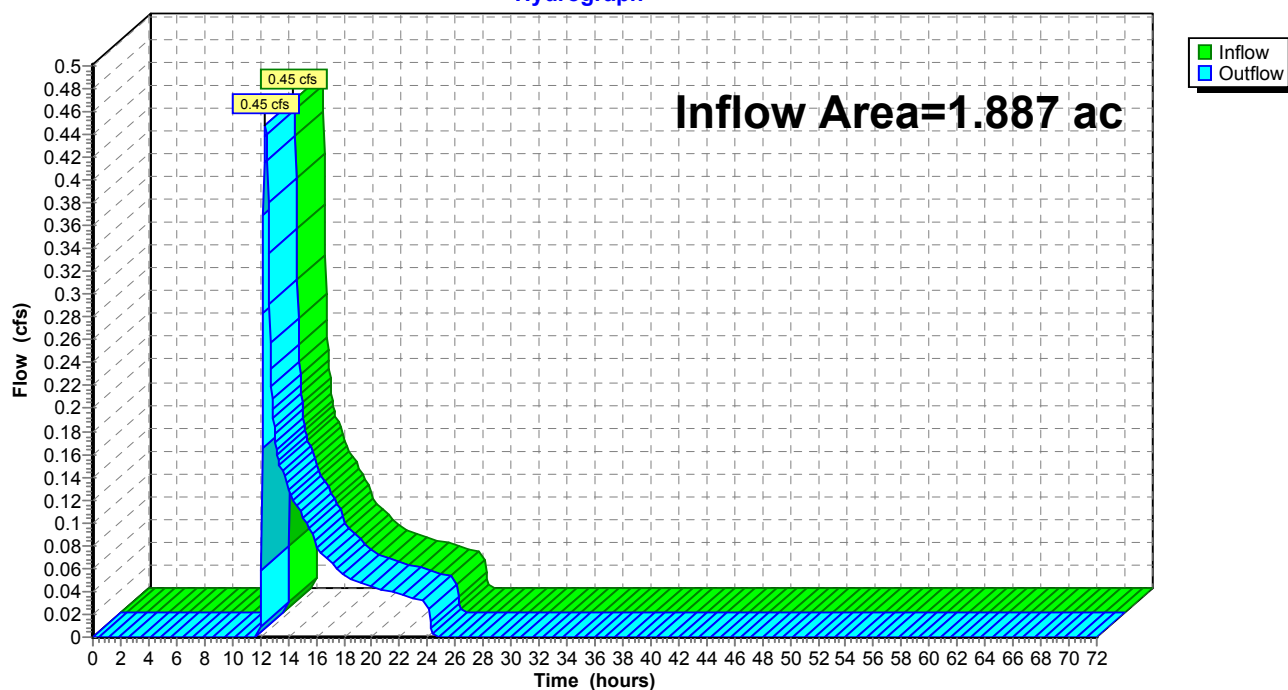
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.887 ac, 0.94% Impervious, Inflow Depth = 0.54" for 25-yr event
Inflow = 0.45 cfs @ 12.40 hrs, Volume= 0.084 af
Outflow = 0.45 cfs @ 12.40 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St

Hydrograph



215-181 PRE-DEV*Type III 24-hr 100-yr Rainfall=7.00"*

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Page 23

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentE1: SW PropertyRunoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.56"
Flow Length=406' Tc=12.0 min CN=36 Runoff=0.96 cfs 0.203 af**SubcatchmentE2: Central Property**Runoff Area=536,132 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=808' Tc=17.9 min CN=48 Runoff=12.46 cfs 1.529 af**SubcatchmentE3: SE Property**Runoff Area=82,214 sf 0.94% Impervious Runoff Depth=1.07"
Flow Length=290' Tc=13.3 min CN=43 Runoff=1.27 cfs 0.169 af**Reach DP-1: Wetland**Inflow=13.28 cfs 1.733 af
Outflow=13.28 cfs 1.733 af**Reach DP-2: Water St**Inflow=1.27 cfs 0.169 af
Outflow=1.27 cfs 0.169 af**Total Runoff Area = 18.558 ac Runoff Volume = 1.902 af Average Runoff Depth = 1.23"**
99.90% Pervious = 18.540 ac 0.10% Impervious = 0.018 ac

Summary for Subcatchment E1: SW Property

Runoff = 0.96 cfs @ 12.42 hrs, Volume= 0.203 af, Depth= 0.56"

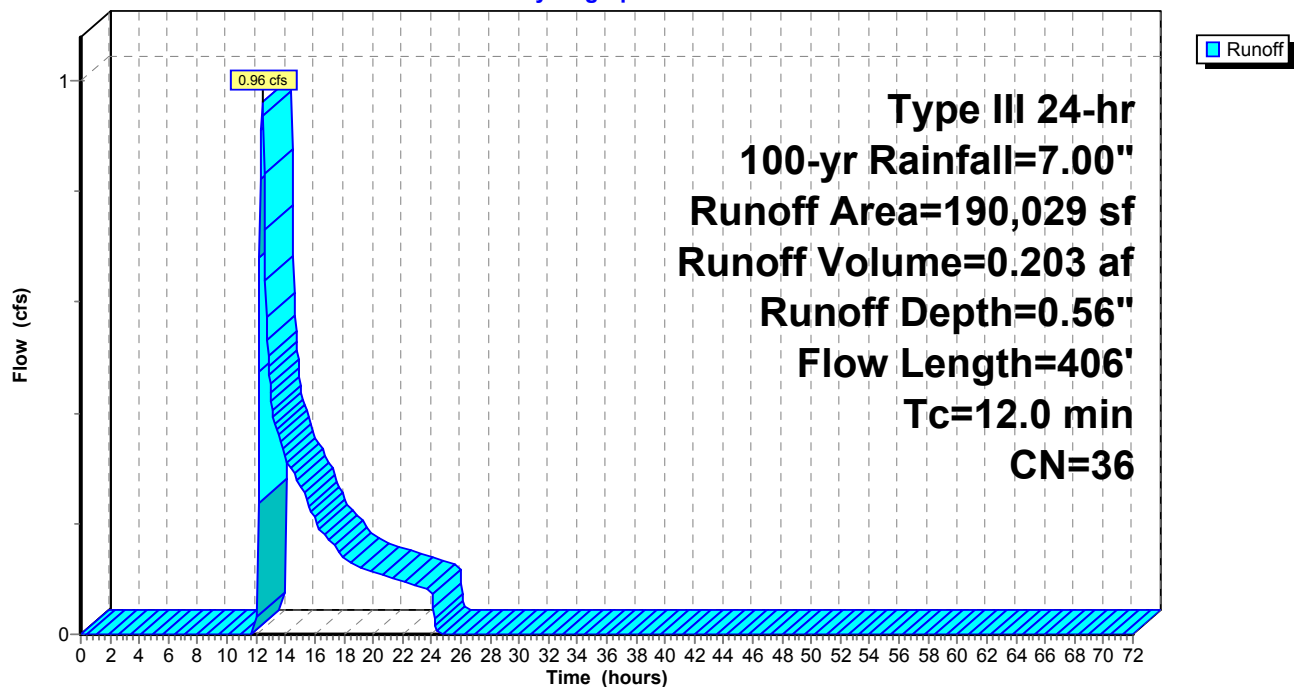
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
190,029	36	Woods, Fair, HSG A
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	356	0.0400	3.22		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	406	Total			

Subcatchment E1: SW Property

Hydrograph



Summary for Subcatchment E2: Central Property

Runoff = 12.46 cfs @ 12.30 hrs, Volume= 1.529 af, Depth= 1.49"

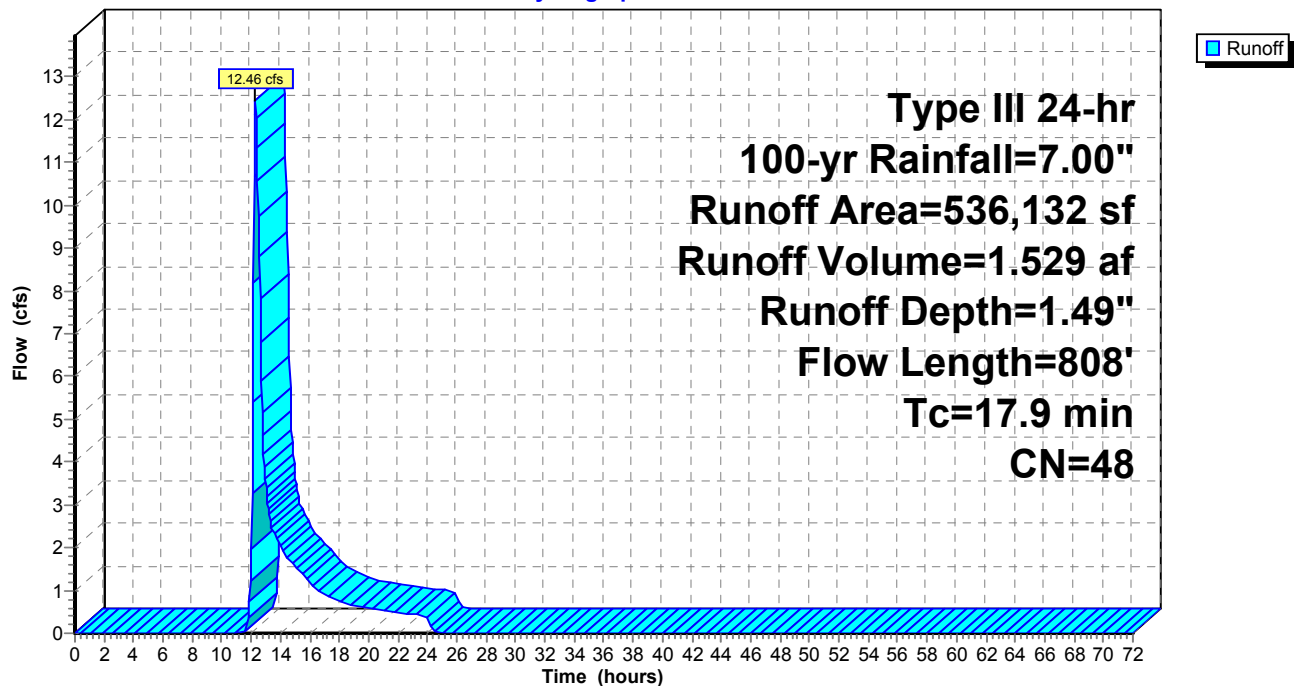
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
299,040	30	Woods, Good, HSG A
237,092	70	Woods, Good, HSG C
536,132	48	Weighted Average
536,132		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.4	50	0.0150	0.06		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
4.5	758	0.0310	2.83		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.9	808	Total			

Subcatchment E2: Central Property

Hydrograph



Summary for Subcatchment E3: SE Property

Runoff = 1.27 cfs @ 12.25 hrs, Volume= 0.169 af, Depth= 1.07"

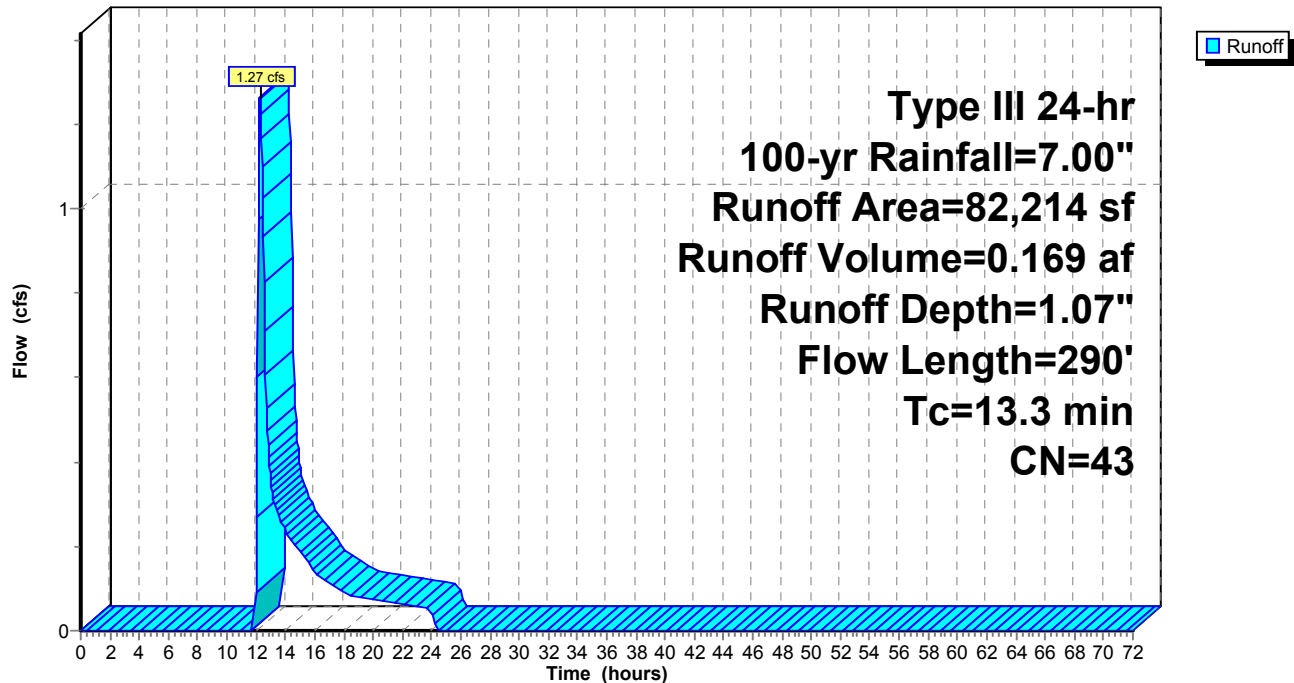
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
48,838	30	Woods, Good, HSG A
20,856	70	Woods, Good, HSG C
11,750	49	50-75% Grass cover, Fair, HSG A
770	98	Paved parking, HSG A
82,214	43	Weighted Average
81,444		99.06% Pervious Area
770		0.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment E3: SE Property

Hydrograph



Summary for Reach DP-1: Wetland

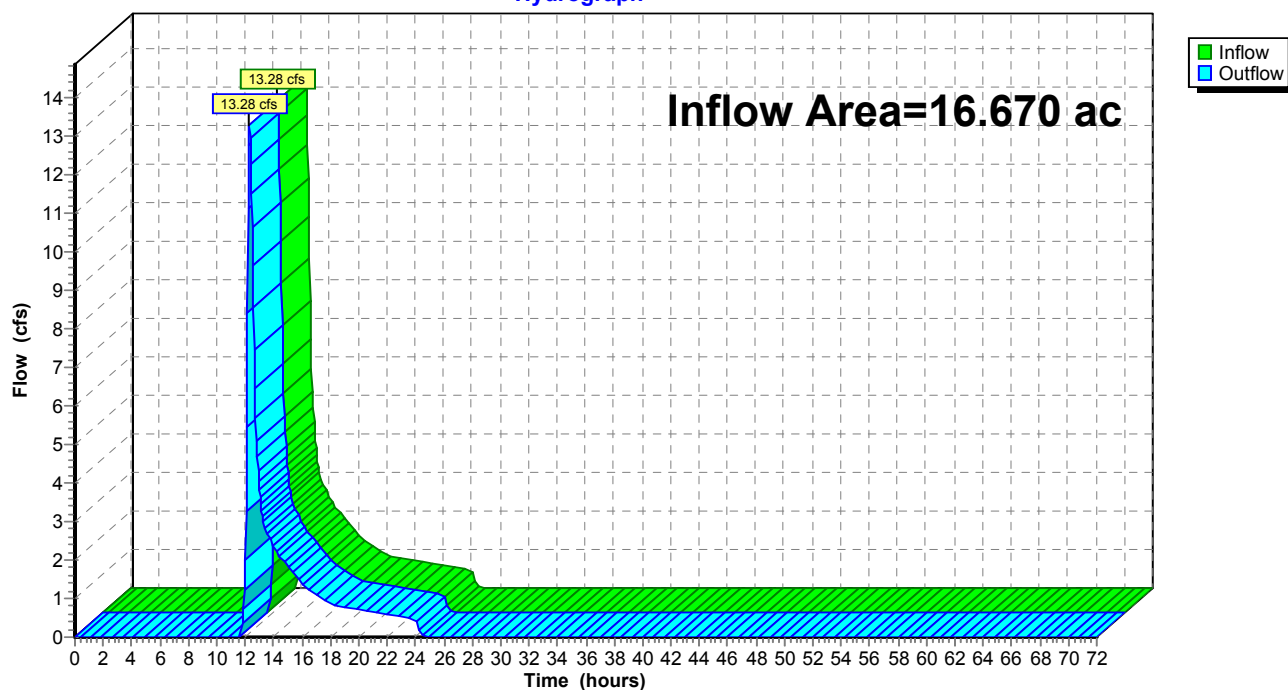
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16.670 ac, 0.00% Impervious, Inflow Depth = 1.25" for 100-yr event
Inflow = 13.28 cfs @ 12.30 hrs, Volume= 1.733 af
Outflow = 13.28 cfs @ 12.30 hrs, Volume= 1.733 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland

Hydrograph



Summary for Reach DP-2: Water St

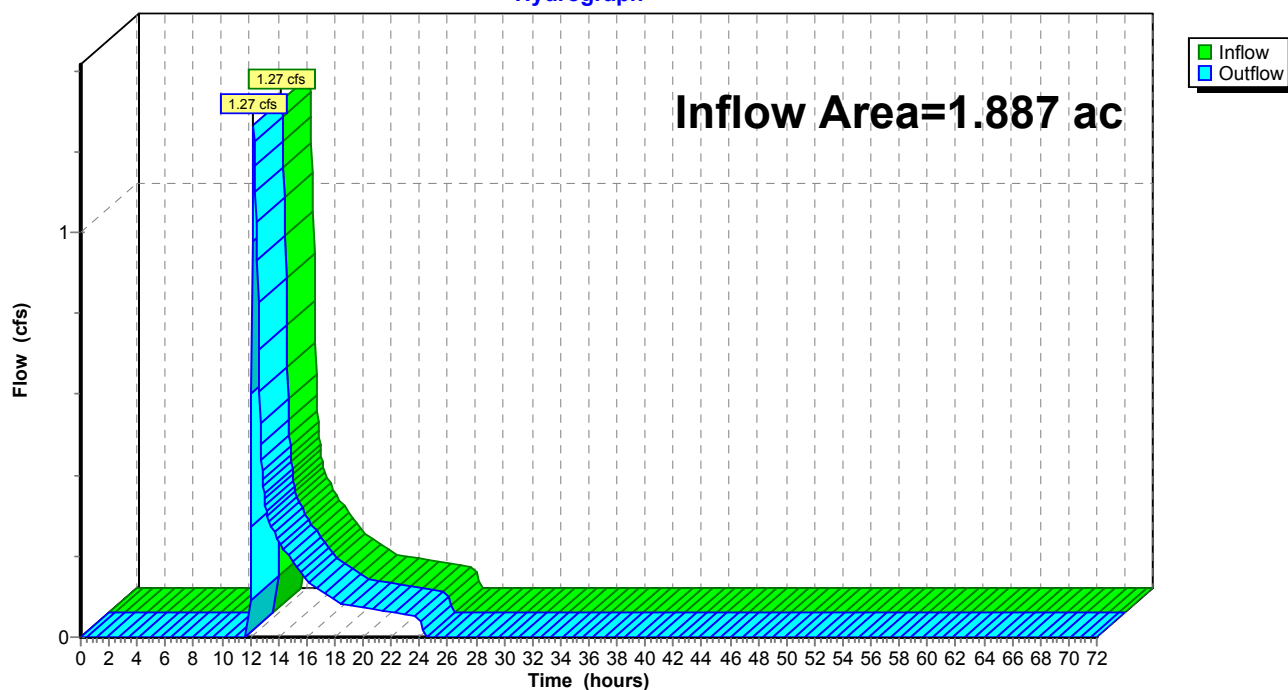
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.887 ac, 0.94% Impervious, Inflow Depth = 1.07" for 100-yr event
Inflow = 1.27 cfs @ 12.25 hrs, Volume= 0.169 af
Outflow = 1.27 cfs @ 12.25 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

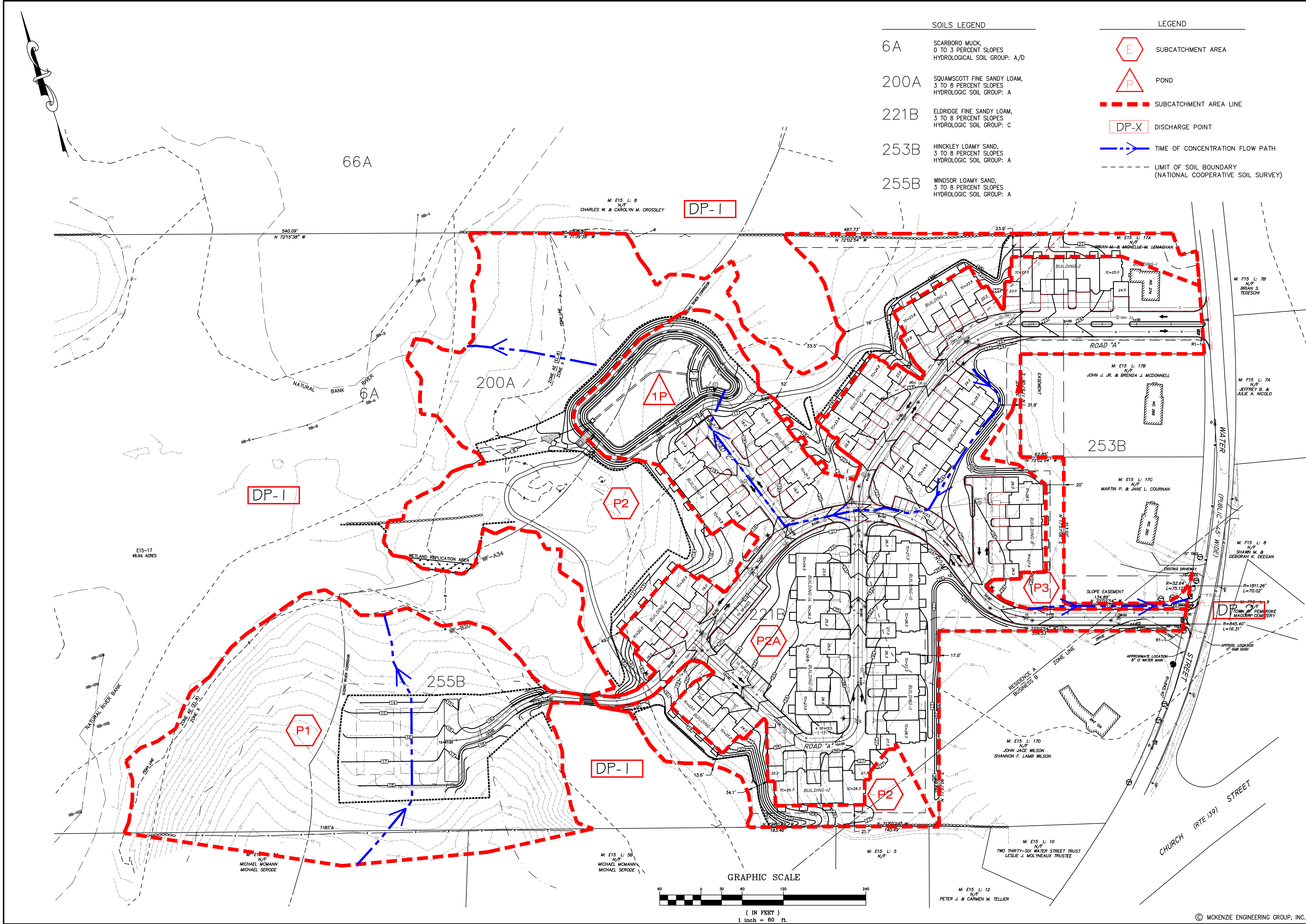
Reach DP-2: Water St

Hydrograph



A P P E N D I X B

Post-Development Condition



SOILS LEGEND	
6A	SCARBORO MUCK, 0 TO 3 PERCENT SLOPES HYDROLOGICAL SOIL GROUP: A/D
200A	SQUAMSCOTT FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES HYDROLOGICAL SOIL GROUP: A
221B	ELDRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES HYDROLOGICAL SOIL GROUP: C
253B	HINKLEY LOAMY SAND, 3 TO 8 PERCENT SLOPES HYDROLOGICAL SOIL GROUP: A
255B	WINDSOR LOAMY SAND, 3 TO 8 PERCENT SLOPES HYDROLOGICAL SOIL GROUP: A

LEGEND	
	SUBCATCHMENT AREA
	POND
	SUBCATCHMENT AREA LINE
	DISCHARGE POINT
	TIME OF CONCENTRATION FLOW PATH
	LIMIT OF SOIL BOUNDARY (NATIONAL COOPERATIVE SOIL SURVEY)

BY	APP	DESCRIPTION	DATE	REV

PREPARED BY:

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F: 781.792.0333
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RIVER MARSH VILLAGE COMPREHENSIVE PERMIT PLAN

(ASSESSOR'S MAP E-17, LOT 0 AND E-17A, LOT 274)

WATER STREET
PEMBROKE, MASSACHUSETTS

PROFESSIONAL ENGINEER:

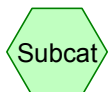
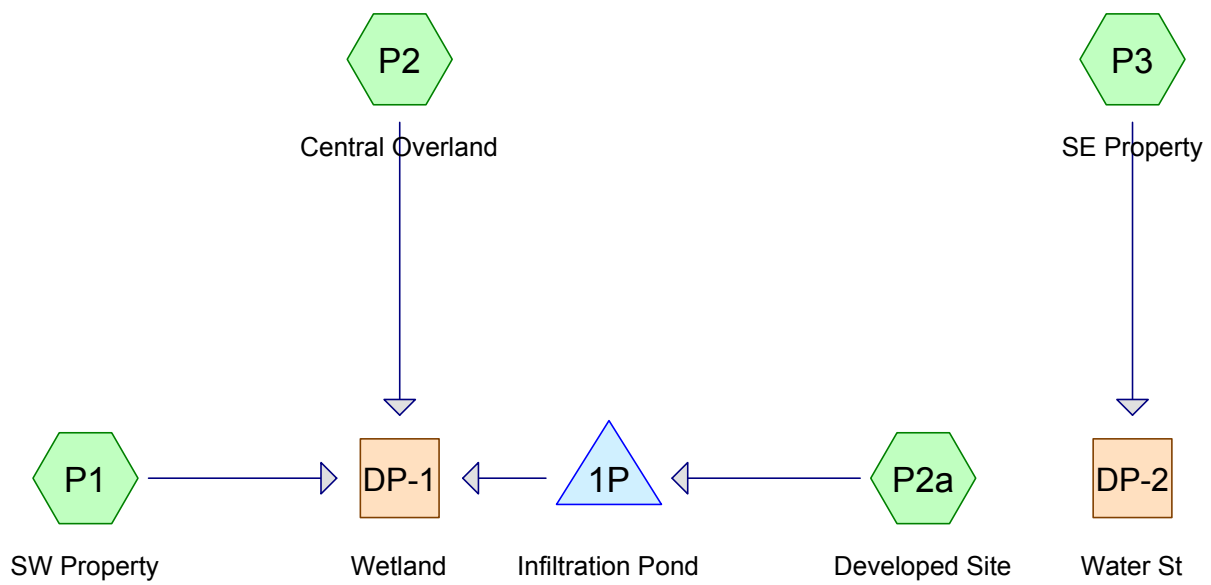
OWNER/APPLICANT:

RIVER MARSH, LLC
293R WASHINGTON STREET
NORWELL, MA 02061

DRAWN BY: AJC
DESIGNED BY: SBS
CHECKED BY: SBS
APPROVED BY: BCM
DATE: AUGUST 1, 2018
SCALE: 1"=60'
PROJECT NO.: 215-181
DWG. TITLE: POST-DEVELOPMENT
WATERSHED
PLAN

DWG. NO:

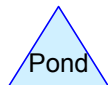
1 OF 1



Subcat



Reach



Pond



Link

Routing Diagram for 215-181 Post-DEV
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215-181 Post-DEV

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.874	39	>75% Grass cover, Good, HSG A (P1, P2, P2a, P3)
0.145	76	Gravel roads, HSG A (P1, P2)
2.372	98	Paved parking, HSG A (P2a)
2.354	98	Roofs, HSG A (P2a)
3.468	36	Woods, Fair, HSG A (P1)
4.345	30	Woods, Good, HSG A (P2, P3)
18.558	52	TOTAL AREA

215-181 Post-DEV

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
18.558	HSG A	P1, P2, P2a, P3
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
18.558		TOTAL AREA

215-181 Post-DEV

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
5.874	0.000	0.000	0.000	0.000	5.874	>75% Grass cover, Good	P1, P2, P2a, P3
0.145	0.000	0.000	0.000	0.000	0.145	Gravel roads	P1, P2
2.372	0.000	0.000	0.000	0.000	2.372	Paved parking	P2a
2.354	0.000	0.000	0.000	0.000	2.354	Roofs	P2a
3.468	0.000	0.000	0.000	0.000	3.468	Woods, Fair	P1
4.345	0.000	0.000	0.000	0.000	4.345	Woods, Good	P2, P3
18.558	0.000	0.000	0.000	0.000	18.558	TOTAL AREA	

215-181 Post-DEV

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Page 5

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	9.75	9.29	46.0	0.0100	0.013	12.0	0.0	0.0

215-181 Post-DEV*Type III 24-hr 2-yr Rainfall=3.40"*

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Page 6

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: SW Property

Runoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=400' Tc=12.0 min CN=38 Runoff=0.00 cfs 0.000 af

SubcatchmentP2: Central Overland

Runoff Area=255,881 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=190' Tc=17.0 min CN=33 Runoff=0.00 cfs 0.000 af

SubcatchmentP2a: Developed Site

Runoff Area=347,600 sf 59.22% Impervious Runoff Depth=1.17"
Tc=0.0 min CN=74 Runoff=12.10 cfs 0.779 af

SubcatchmentP3: SE Property

Runoff Area=14,865 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=290' Tc=13.3 min CN=35 Runoff=0.00 cfs 0.000 af

Reach DP-1: Wetland

Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP-2: Water St

Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Infiltration Pond

Peak Elev=10.65' Storage=15,616 cf Inflow=12.10 cfs 0.779 af
Discarded=0.71 cfs 0.779 af Primary=0.00 cfs 0.000 af Outflow=0.71 cfs 0.779 af

Total Runoff Area = 18.558 ac Runoff Volume = 0.779 af Average Runoff Depth = 0.50"
74.54% Pervious = 13.832 ac 25.46% Impervious = 4.725 ac

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Type III 24-hr 2-yr Rainfall=3.40"

Page 7

Summary for Subcatchment P1: SW Property

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af, Depth= 0.00"

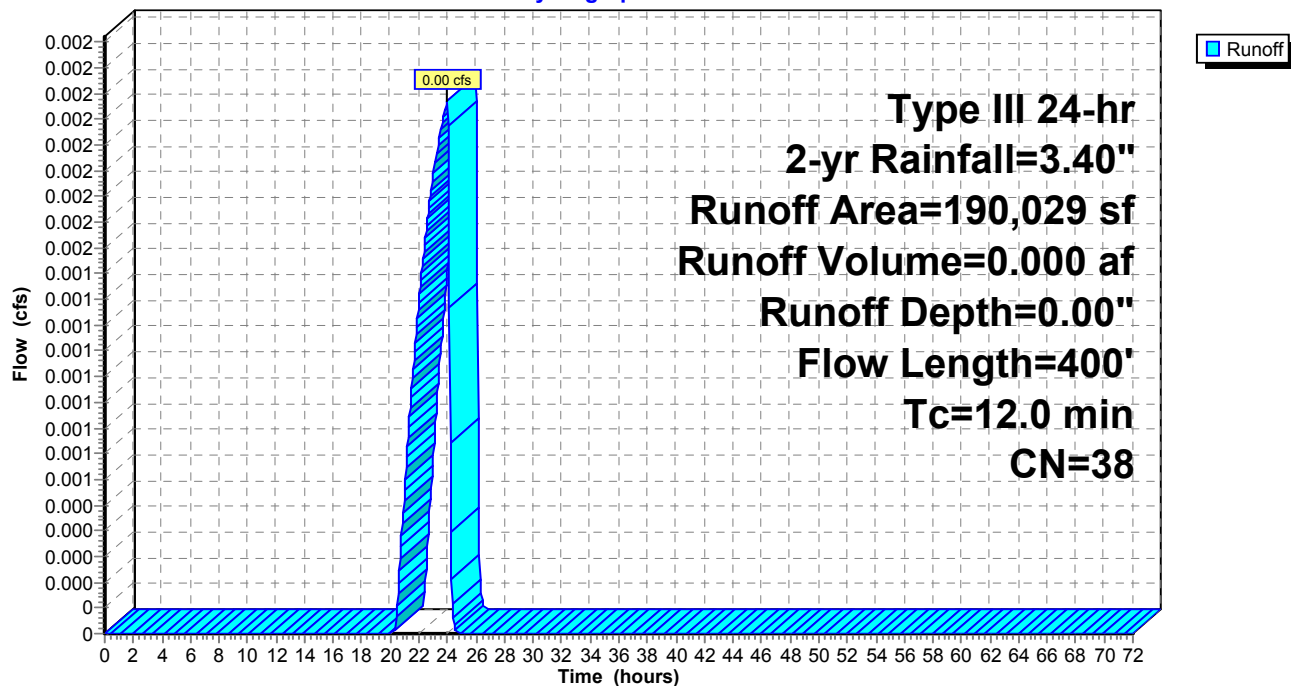
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
151,064	36	Woods, Fair, HSG A
33,865	39	>75% Grass cover, Good, HSG A
5,100	76	Gravel roads, HSG A
190,029	38	Weighted Average
190.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	350	0.0410	3.26		Shallow Concentrated Flow, To Wetland Unpaved Kv= 16.1 fps
12.0	400	Total			

Subcatchment P1: SW Property

Hydrograph



Summary for Subcatchment P2: Central Overland

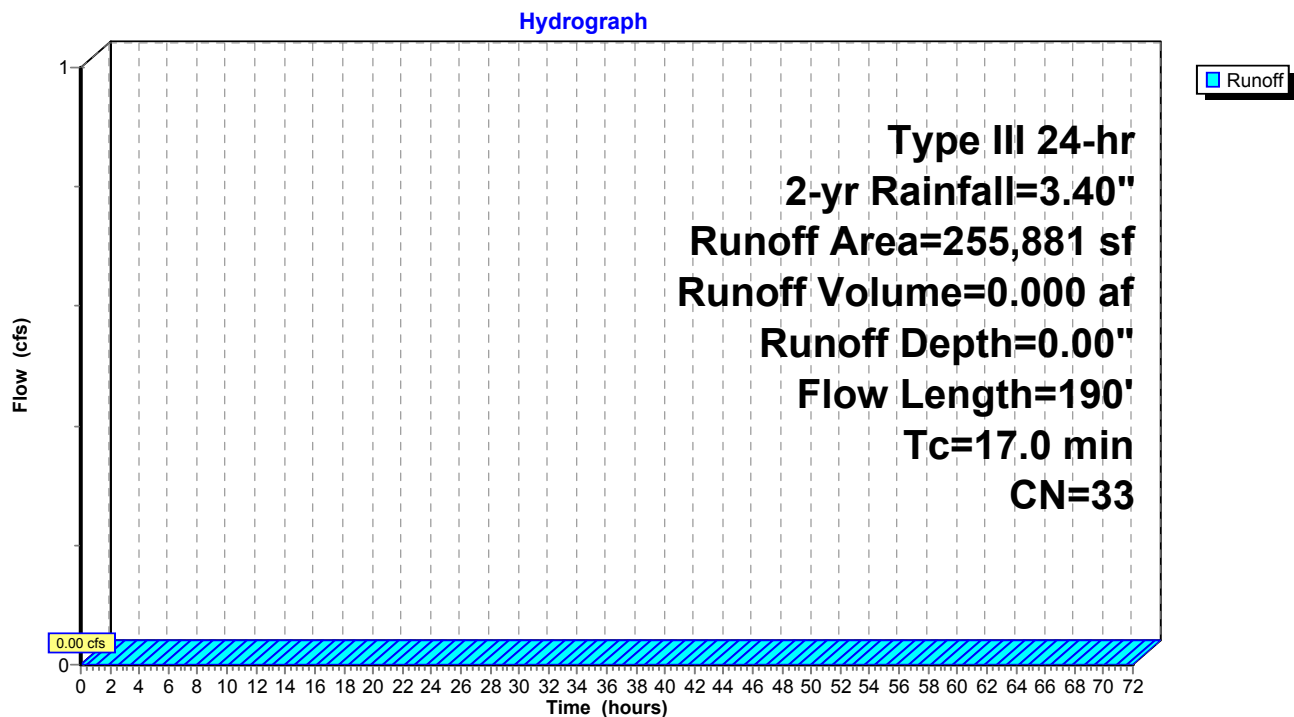
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
183,339	30	Woods, Good, HSG A
71,317	39	>75% Grass cover, Good, HSG A
1,225	76	Gravel roads, HSG A
255,881	33	Weighted Average
255,881		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.2	140	0.0150	1.97		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.0	190	Total			

Subcatchment P2: Central Overland

Summary for Subcatchment P2a: Developed Site[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

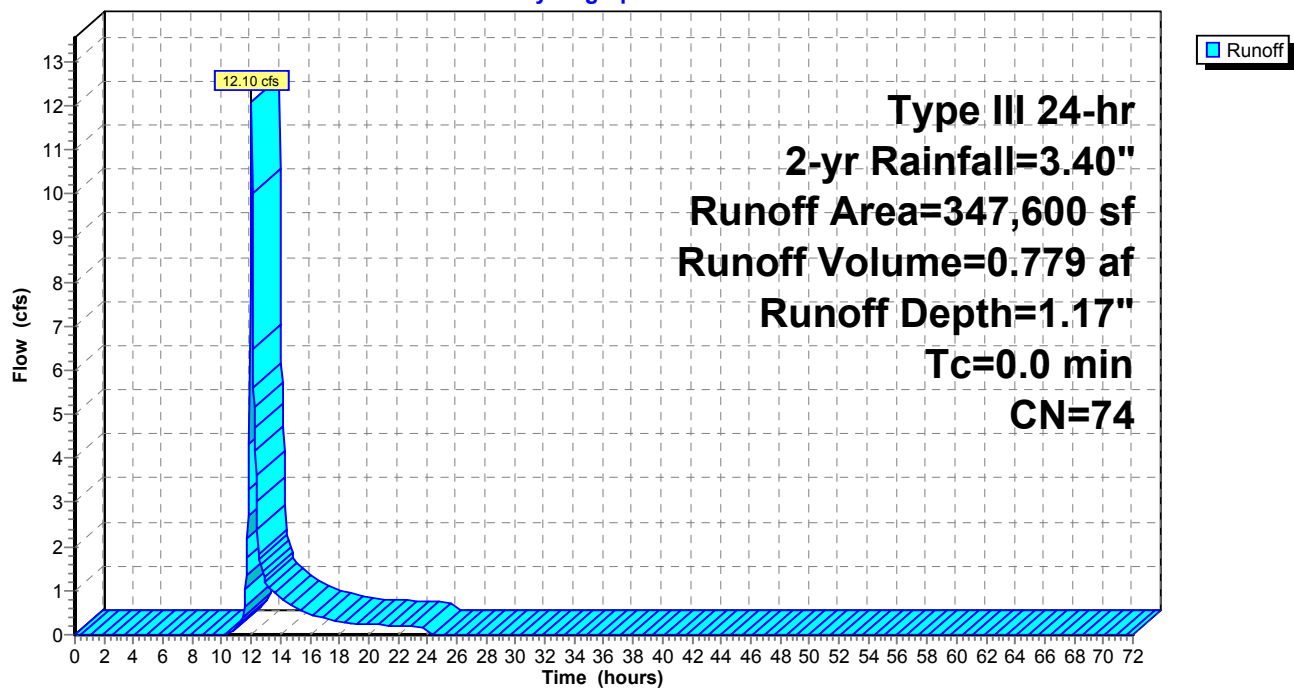
Runoff = 12.10 cfs @ 12.01 hrs, Volume= 0.779 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, $dt=0.05$ hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
141,768	39	>75% Grass cover, Good, HSG A
103,305	98	Paved parking, HSG A
102,527	98	Roofs, HSG A
347,600	74	Weighted Average
141,768		40.78% Pervious Area
205,832		59.22% Impervious Area

Subcatchment P2a: Developed Site

Hydrograph



Summary for Subcatchment P3: SE Property

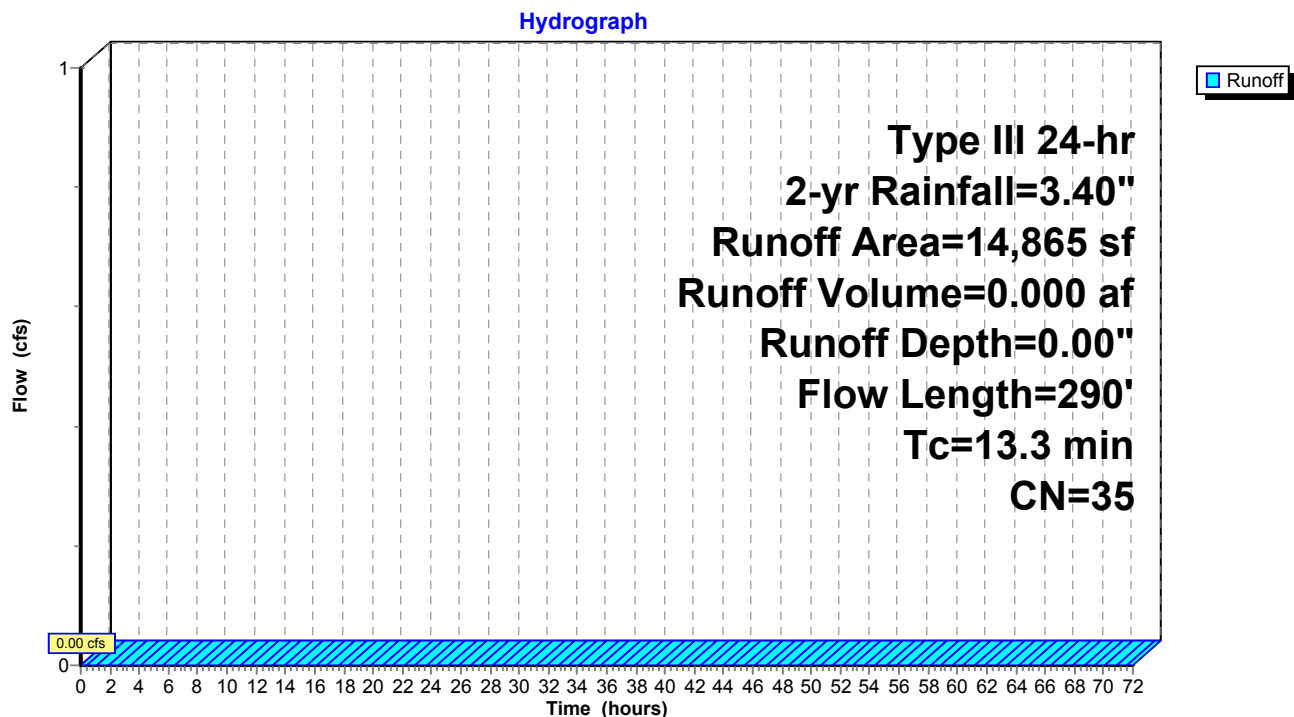
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
5,946	30	Woods, Good, HSG A
8,919	39	>75% Grass cover, Good, HSG A
14,865	35	Weighted Average
14,865		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

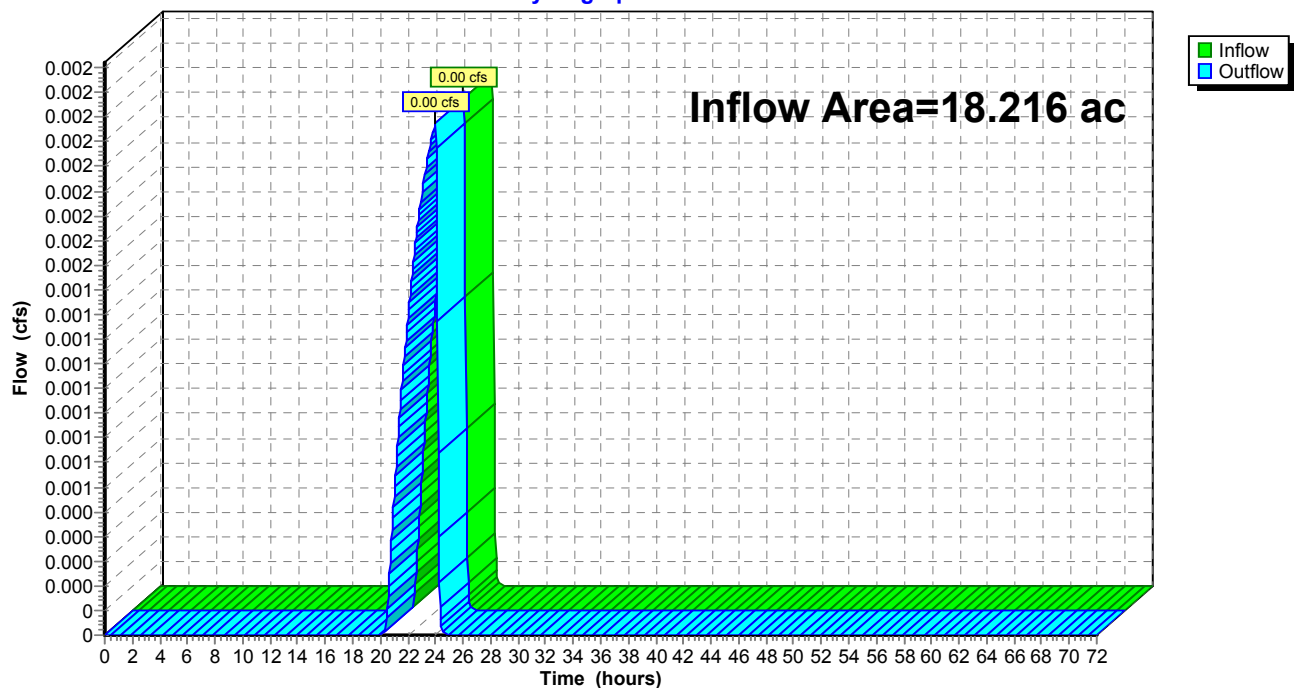
Subcatchment P3: SE Property

Summary for Reach DP-1: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.216 ac, 25.94% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 23.99 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland**Hydrograph**

Summary for Reach DP-2: Water St

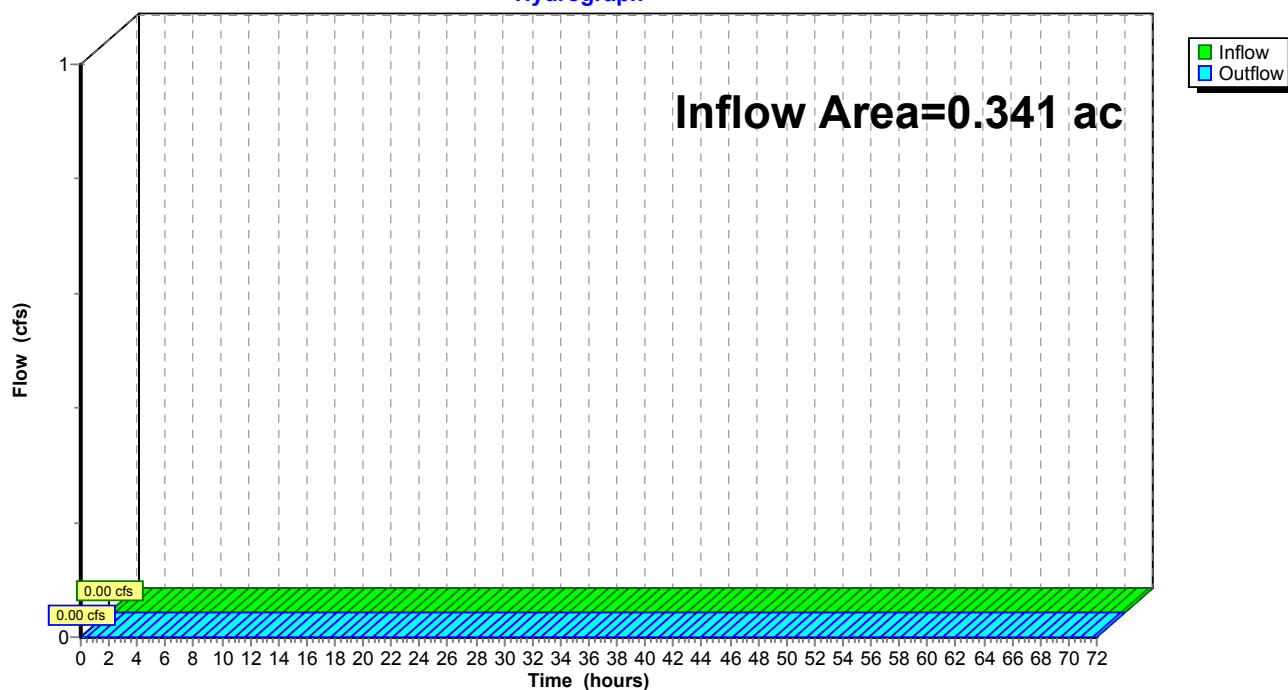
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.341 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-yr event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St

Hydrograph



Summary for Pond 1P: Infiltration Pond

Inflow Area = 7.980 ac, 59.22% Impervious, Inflow Depth = 1.17" for 2-yr event
 Inflow = 12.10 cfs @ 12.01 hrs, Volume= 0.779 af
 Outflow = 0.71 cfs @ 11.85 hrs, Volume= 0.779 af, Atten= 94%, Lag= 0.0 min
 Discarded = 0.71 cfs @ 11.85 hrs, Volume= 0.779 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.65' @ 14.57 hrs Surf.Area= 14,460 sf Storage= 15,616 cf

Plug-Flow detention time= 233.3 min calculated for 0.778 af (100% of inflow)
 Center-of-Mass det. time= 233.3 min (1,086.0 - 852.8)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	75,823 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	12,792	0	0
10.00	13,508	6,575	6,575
11.00	14,981	14,245	20,820
12.00	19,481	17,231	38,051
13.00	21,280	20,381	58,431
13.80	22,200	17,392	75,823

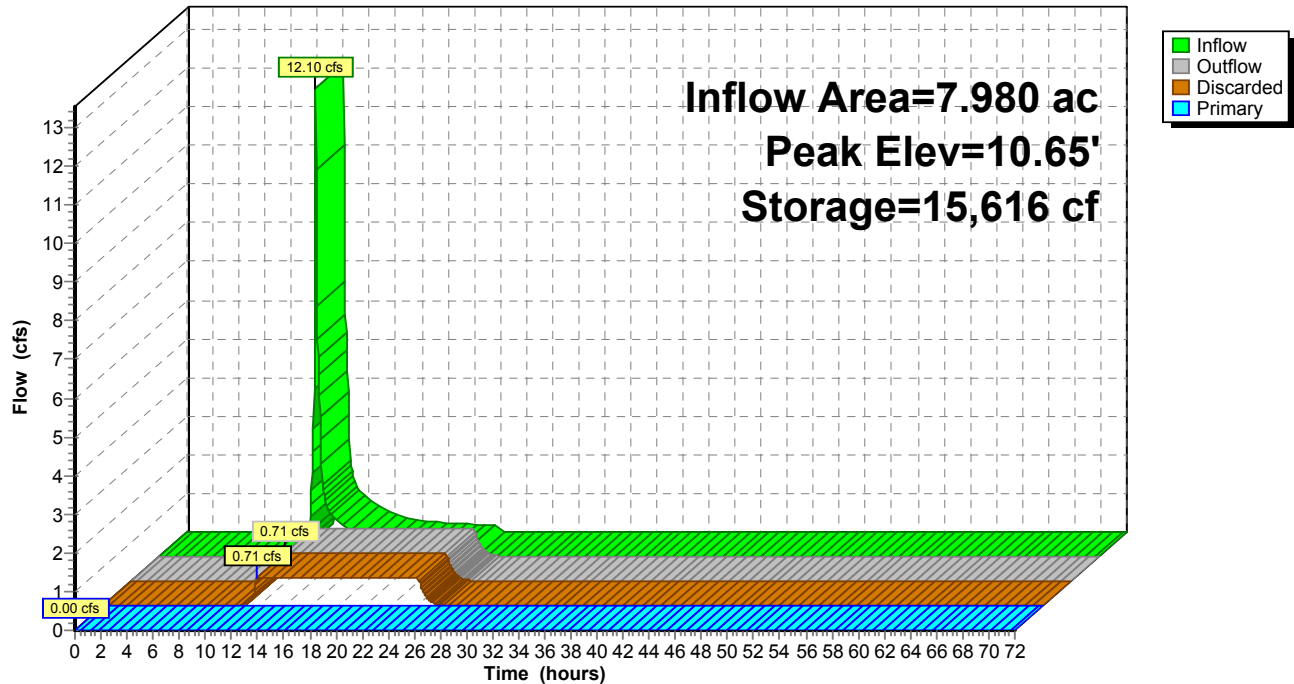
Device	Routing	Invert	Outlet Devices
#1	Primary	10.80'	2.0' long x 2.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Device 1	9.75'	12.0" Round Culvert L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 9.75' / 9.29' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Discarded	9.50'	Special & User-Defined Head (feet) 0.00 0.10 1.00 1.50 1.69 1.70 4.00 Disch. (cfs) 0.000 0.714 0.714 0.714 0.714 0.000 0.000

Discarded OutFlow Max=0.71 cfs @ 11.85 hrs HW=9.65' (Free Discharge)
 ↑**3=Special & User-Defined** (Custom Controls 0.71 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=9.50' (Free Discharge)
 ↑**1=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↑**2=Culvert** (Controls 0.00 cfs)

Pond 1P: Infiltration Pond

Hydrograph



215-181 Post-DEV*Type III 24-hr 10-yr Rainfall=4.70"*

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Page 15

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: SW PropertyRunoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=400' Tc=12.0 min CN=38 Runoff=0.07 cfs 0.042 af**SubcatchmentP2: Central Overland**Runoff Area=255,881 sf 0.00% Impervious Runoff Depth=0.02"
Flow Length=190' Tc=17.0 min CN=33 Runoff=0.02 cfs 0.010 af**SubcatchmentP2a: Developed Site**Runoff Area=347,600 sf 59.22% Impervious Runoff Depth=2.13"
Tc=0.0 min CN=74 Runoff=22.72 cfs 1.415 af**SubcatchmentP3: SE Property**Runoff Area=14,865 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=290' Tc=13.3 min CN=35 Runoff=0.00 cfs 0.001 af**Reach DP-1: Wetland**Inflow=1.62 cfs 0.449 af
Outflow=1.62 cfs 0.449 af**Reach DP-2: Water St**Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af**Pond 1P: Infiltration Pond**Peak Elev=11.36' Storage=26,505 cf Inflow=22.72 cfs 1.415 af
Discarded=0.71 cfs 1.018 af Primary=1.52 cfs 0.397 af Outflow=2.23 cfs 1.415 af**Total Runoff Area = 18.558 ac Runoff Volume = 1.468 af Average Runoff Depth = 0.95"**
74.54% Pervious = 13.832 ac 25.46% Impervious = 4.725 ac

215-181 Post-DEV

Type III 24-hr 10-yr Rainfall=4.70"

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Page 16

Summary for Subcatchment P1: SW Property

Runoff = 0.07 cfs @ 14.79 hrs, Volume= 0.042 af, Depth= 0.12"

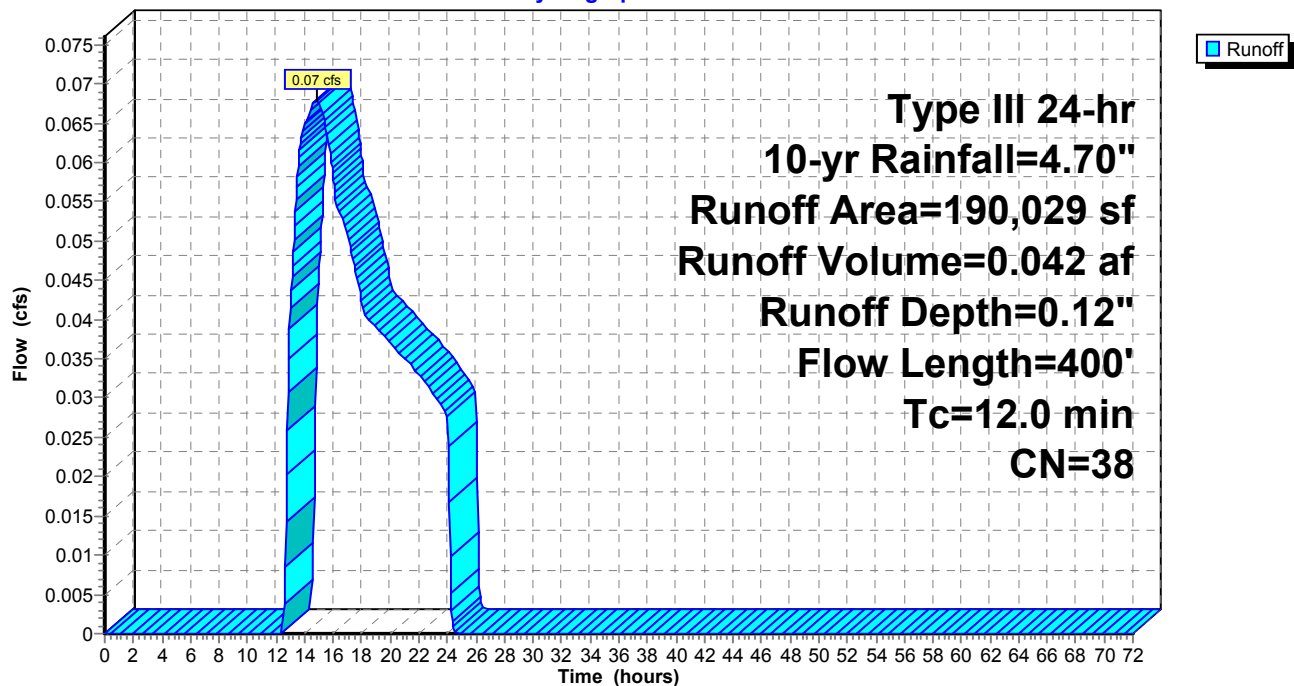
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
151,064	36	Woods, Fair, HSG A
33,865	39	>75% Grass cover, Good, HSG A
5,100	76	Gravel roads, HSG A
190,029	38	Weighted Average
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	350	0.0410	3.26		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	400	Total			

Subcatchment P1: SW Property

Hydrograph



215-181 Post-DEV

Type III 24-hr 10-yr Rainfall=4.70"

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Page 17

Summary for Subcatchment P2: Central Overland

Runoff = 0.02 cfs @ 21.65 hrs, Volume= 0.010 af, Depth= 0.02"

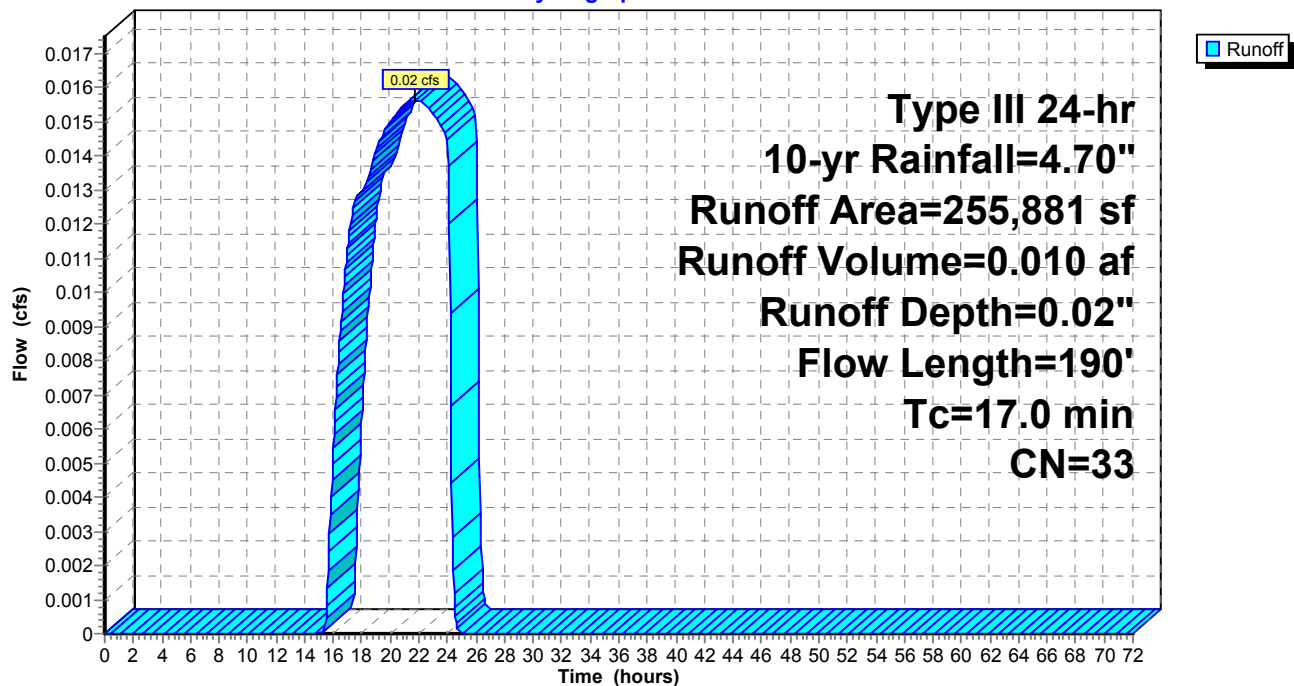
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
183,339	30	Woods, Good, HSG A
71,317	39	>75% Grass cover, Good, HSG A
1,225	76	Gravel roads, HSG A
255,881	33	Weighted Average
255,881		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.2	140	0.0150	1.97		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.0	190	Total			

Subcatchment P2: Central Overland

Hydrograph



Summary for Subcatchment P2a: Developed Site

[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

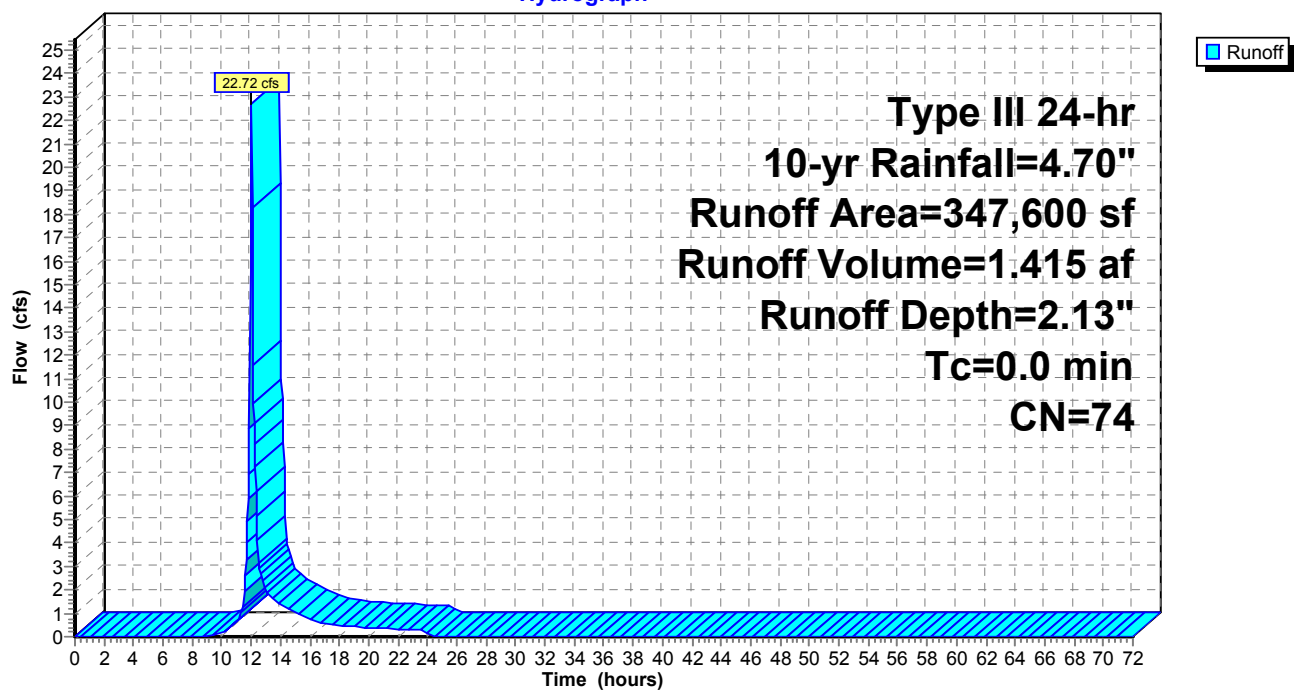
Runoff = 22.72 cfs @ 12.01 hrs, Volume= 1.415 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, $dt=0.05$ hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
141,768	39	>75% Grass cover, Good, HSG A
103,305	98	Paved parking, HSG A
102,527	98	Roofs, HSG A
347,600	74	Weighted Average
141,768		40.78% Pervious Area
205,832		59.22% Impervious Area

Subcatchment P2a: Developed Site

Hydrograph



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Type III 24-hr 10-yr Rainfall=4.70"

Page 19

Summary for Subcatchment P3: SE Property

Runoff = 0.00 cfs @ 15.75 hrs, Volume= 0.001 af, Depth= 0.05"

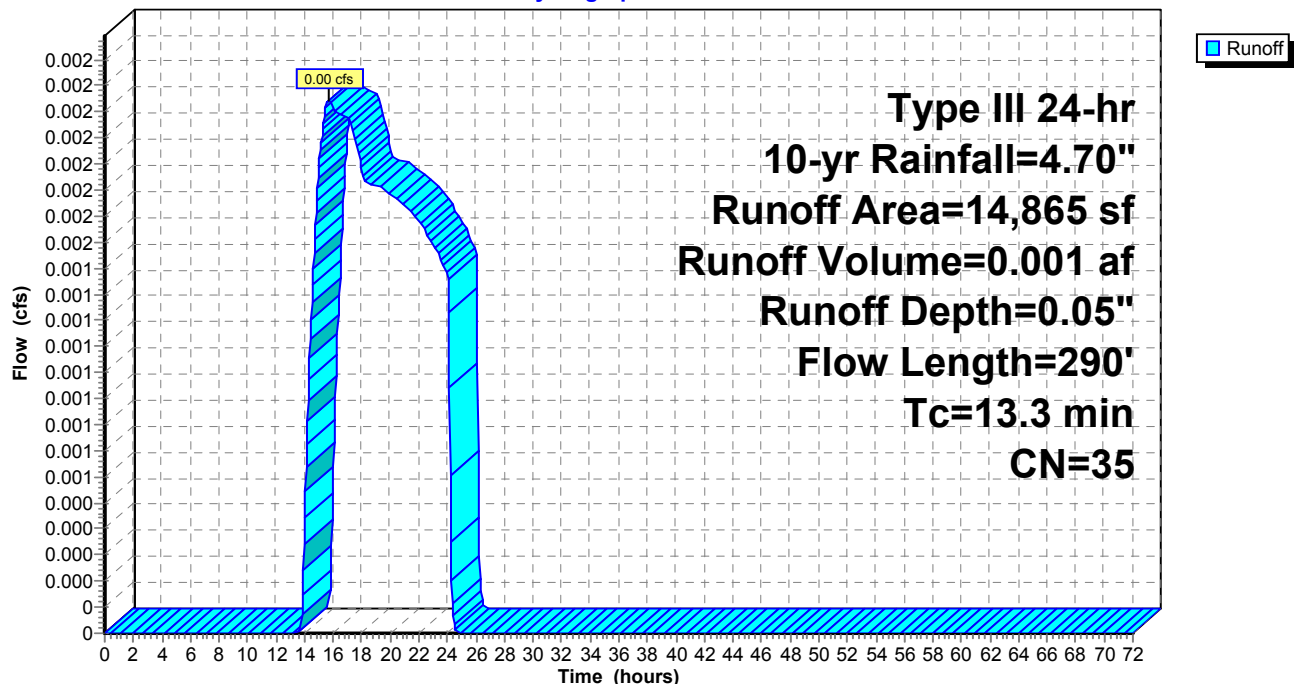
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.70"

Area (sf)	CN	Description
5,946	30	Woods, Good, HSG A
8,919	39	>75% Grass cover, Good, HSG A
14,865	35	Weighted Average
14,865		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment P3: SE Property

Hydrograph



Summary for Reach DP-1: Wetland

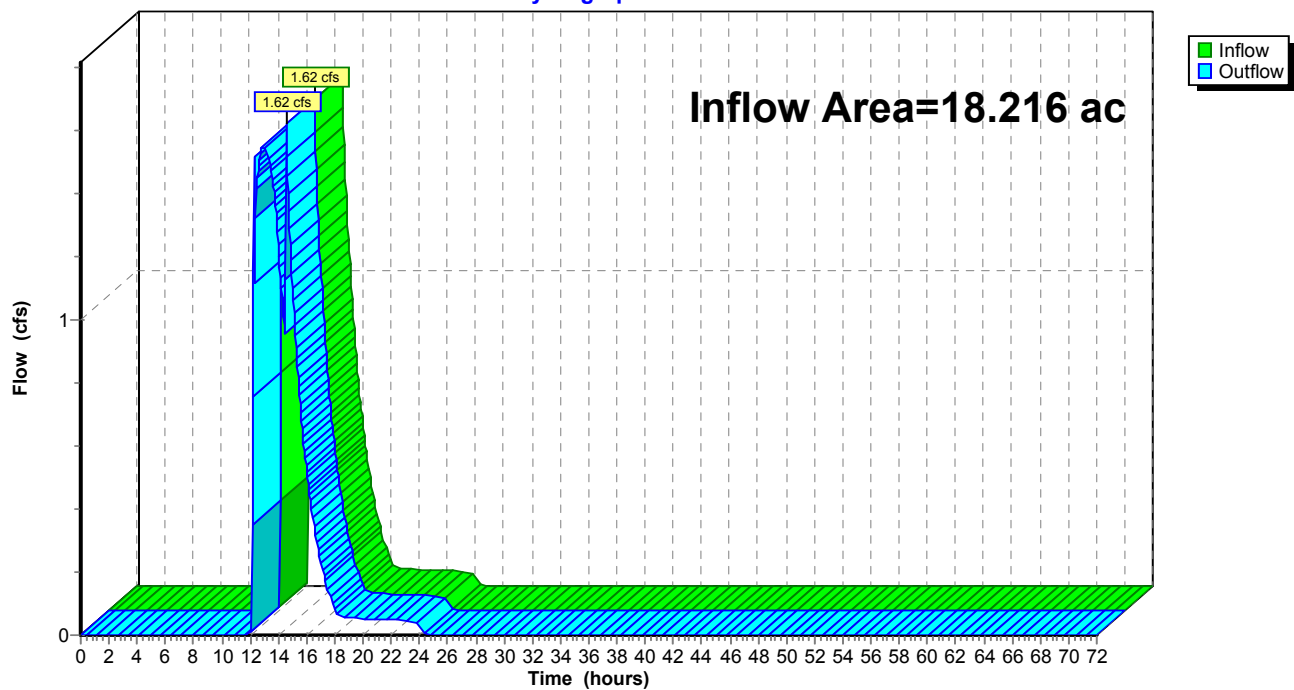
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.216 ac, 25.94% Impervious, Inflow Depth = 0.30" for 10-yr event
Inflow = 1.62 cfs @ 14.57 hrs, Volume= 0.449 af
Outflow = 1.62 cfs @ 14.57 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-1: Wetland

Hydrograph



Summary for Reach DP-2: Water St

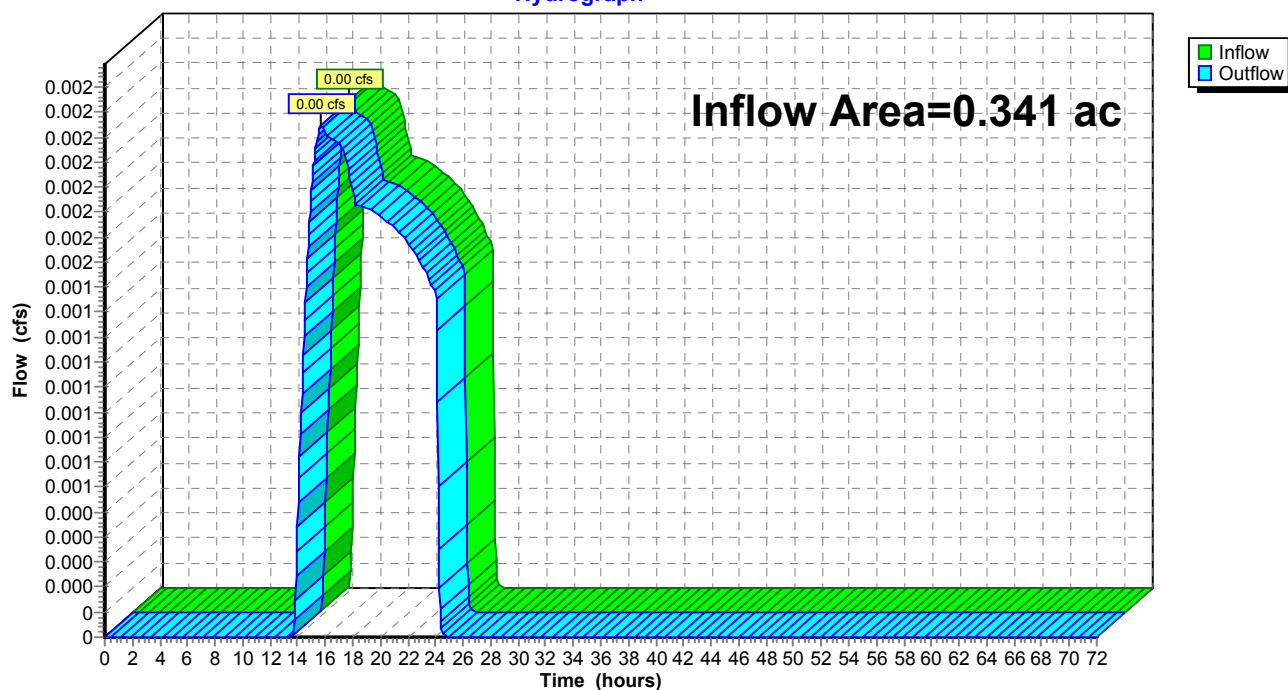
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.341 ac, 0.00% Impervious, Inflow Depth = 0.05" for 10-yr event
Inflow = 0.00 cfs @ 15.75 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.75 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St

Hydrograph



Summary for Pond 1P: Infiltration Pond

Inflow Area = 7.980 ac, 59.22% Impervious, Inflow Depth = 2.13" for 10-yr event
 Inflow = 22.72 cfs @ 12.01 hrs, Volume= 1.415 af
 Outflow = 2.23 cfs @ 12.86 hrs, Volume= 1.415 af, Atten= 90%, Lag= 51.2 min
 Discarded = 0.71 cfs @ 11.60 hrs, Volume= 1.018 af
 Primary = 1.52 cfs @ 12.86 hrs, Volume= 0.397 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.36' @ 12.86 hrs Surf.Area= 16,601 sf Storage= 26,505 cf

Plug-Flow detention time= 238.0 min calculated for 1.414 af (100% of inflow)
 Center-of-Mass det. time= 238.1 min (1,073.0 - 835.0)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	75,823 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	12,792	0	0
10.00	13,508	6,575	6,575
11.00	14,981	14,245	20,820
12.00	19,481	17,231	38,051
13.00	21,280	20,381	58,431
13.80	22,200	17,392	75,823

Device	Routing	Invert	Outlet Devices
#1	Primary	10.80'	2.0' long x 2.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Device 1	9.75'	12.0" Round Culvert L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 9.75' / 9.29' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Discarded	9.50'	Special & User-Defined Head (feet) 0.00 0.10 1.00 1.50 1.69 1.70 4.00 Disch. (cfs) 0.000 0.714 0.714 0.714 0.714 0.000 0.000

Discarded OutFlow Max=0.71 cfs @ 11.60 hrs HW=9.65' (Free Discharge)

↑**3=Special & User-Defined** (Custom Controls 0.71 cfs)

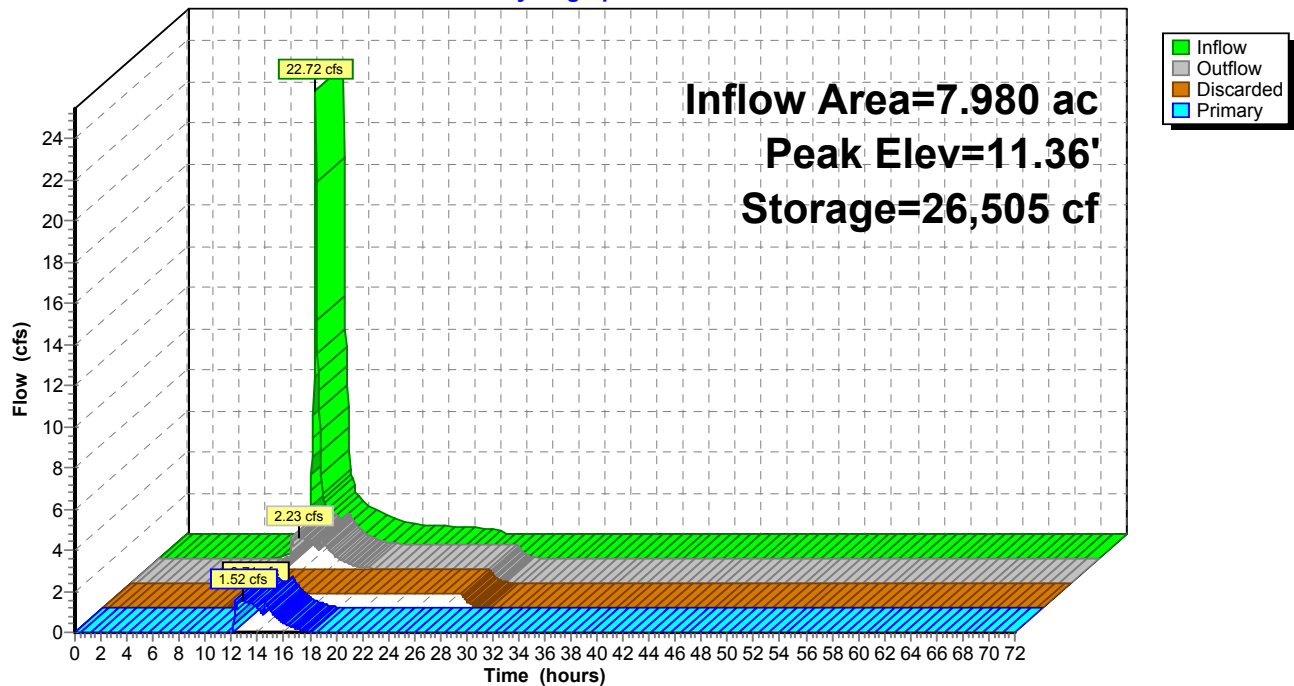
Primary OutFlow Max=2.23 cfs @ 12.86 hrs HW=11.36' (Free Discharge)

↑**1=Sharp-Crested Rectangular Weir** (Passes 2.23 cfs of 2.59 cfs potential flow)

↑**2=Culvert** (Inlet Controls 2.23 cfs @ 2.84 fps)

Pond 1P: Infiltration Pond

Hydrograph



215-181 Post-DEV*Type III 24-hr 25-yr Rainfall=5.60"*

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Page 24

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: SW Property

Runoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.29"
Flow Length=400' Tc=12.0 min CN=38 Runoff=0.33 cfs 0.106 af

SubcatchmentP2: Central Overland

Runoff Area=255,881 sf 0.00% Impervious Runoff Depth=0.11"
Flow Length=190' Tc=17.0 min CN=33 Runoff=0.08 cfs 0.053 af

SubcatchmentP2a: Developed Site

Runoff Area=347,600 sf 59.22% Impervious Runoff Depth=2.85"
Tc=0.0 min CN=74 Runoff=30.64 cfs 1.896 af

SubcatchmentP3: SE Property

Runoff Area=14,865 sf 0.00% Impervious Runoff Depth=0.17"
Flow Length=290' Tc=13.3 min CN=35 Runoff=0.01 cfs 0.005 af

Reach DP-1: Wetland

Inflow=3.42 cfs 1.135 af
Outflow=3.42 cfs 1.135 af

Reach DP-2: Water St

Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 1P: Infiltration Pond

Peak Elev=11.89' Storage=35,905 cf Inflow=30.64 cfs 1.896 af
Discarded=0.71 cfs 0.921 af Primary=3.11 cfs 0.976 af Outflow=3.11 cfs 1.896 af

Total Runoff Area = 18.558 ac Runoff Volume = 2.061 af Average Runoff Depth = 1.33"
74.54% Pervious = 13.832 ac 25.46% Impervious = 4.725 ac

215-181 Post-DEV

Type III 24-hr 25-yr Rainfall=5.60"

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Page 25

Summary for Subcatchment P1: SW Property

Runoff = 0.33 cfs @ 12.51 hrs, Volume= 0.106 af, Depth= 0.29"

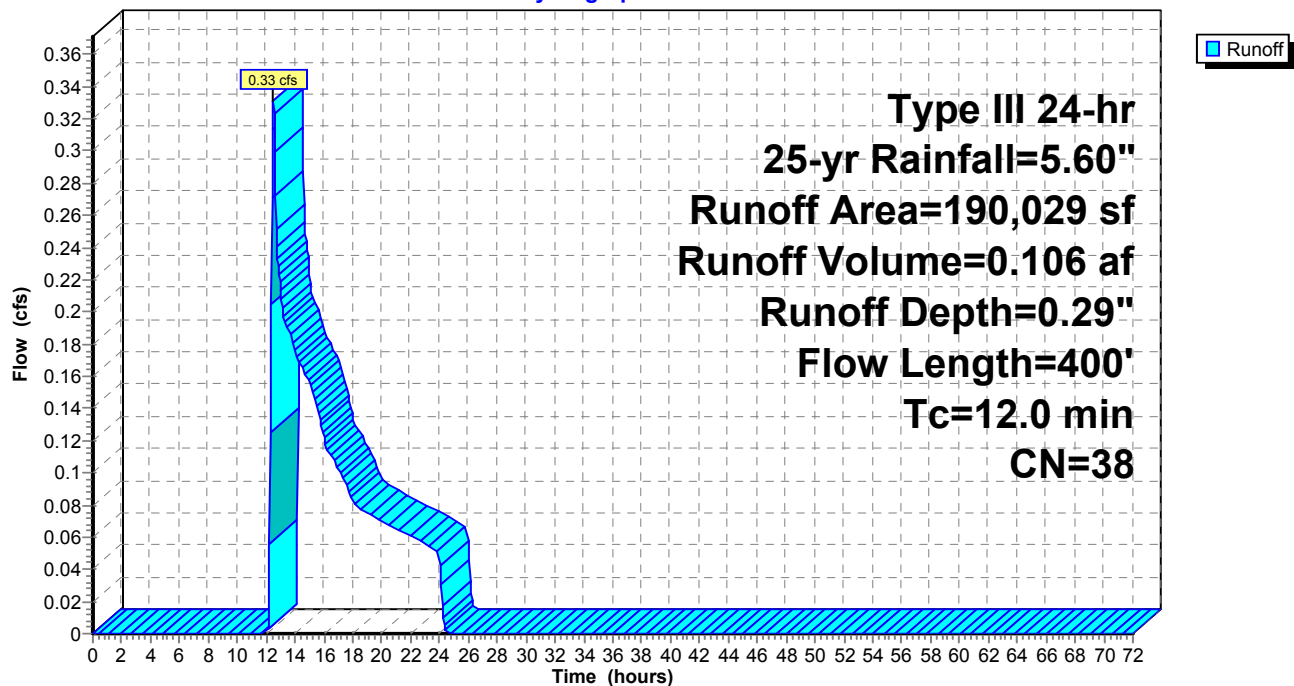
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
151,064	36	Woods, Fair, HSG A
33,865	39	>75% Grass cover, Good, HSG A
5,100	76	Gravel roads, HSG A
190,029	38	Weighted Average
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	350	0.0410	3.26		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	400	Total			

Subcatchment P1: SW Property

Hydrograph



215-181 Post-DEV

Type III 24-hr 25-yr Rainfall=5.60"

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Page 26

Summary for Subcatchment P2: Central Overland

Runoff = 0.08 cfs @ 15.15 hrs, Volume= 0.053 af, Depth= 0.11"

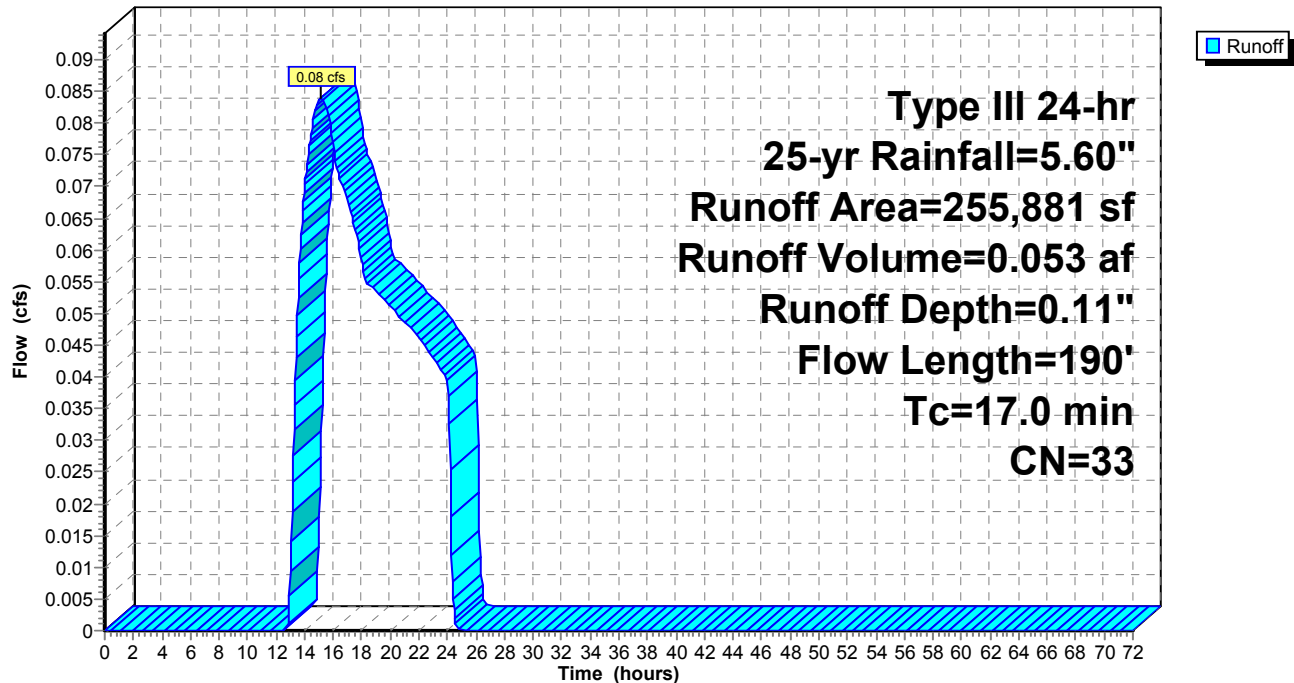
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
183,339	30	Woods, Good, HSG A
71,317	39	>75% Grass cover, Good, HSG A
1,225	76	Gravel roads, HSG A
255,881	33	Weighted Average
255,881		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.2	140	0.0150	1.97		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.0	190	Total			

Subcatchment P2: Central Overland

Hydrograph

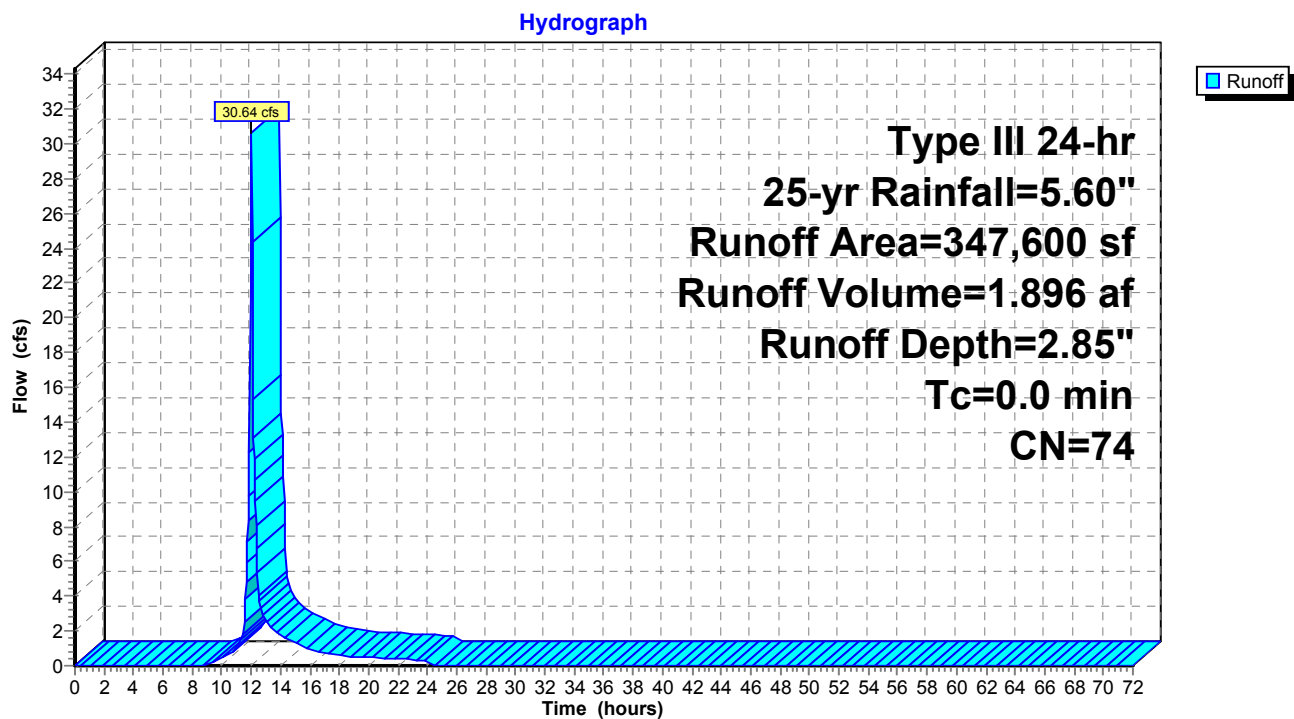


Summary for Subcatchment P2a: Developed Site[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

Runoff = 30.64 cfs @ 12.00 hrs, Volume= 1.896 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, $dt=0.05$ hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
141,768	39	>75% Grass cover, Good, HSG A
103,305	98	Paved parking, HSG A
102,527	98	Roofs, HSG A
347,600	74	Weighted Average
141,768		40.78% Pervious Area
205,832		59.22% Impervious Area

Subcatchment P2a: Developed Site

215-181 Post-DEV

Type III 24-hr 25-yr Rainfall=5.60"

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Page 28

Summary for Subcatchment P3: SE Property

Runoff = 0.01 cfs @ 13.86 hrs, Volume= 0.005 af, Depth= 0.17"

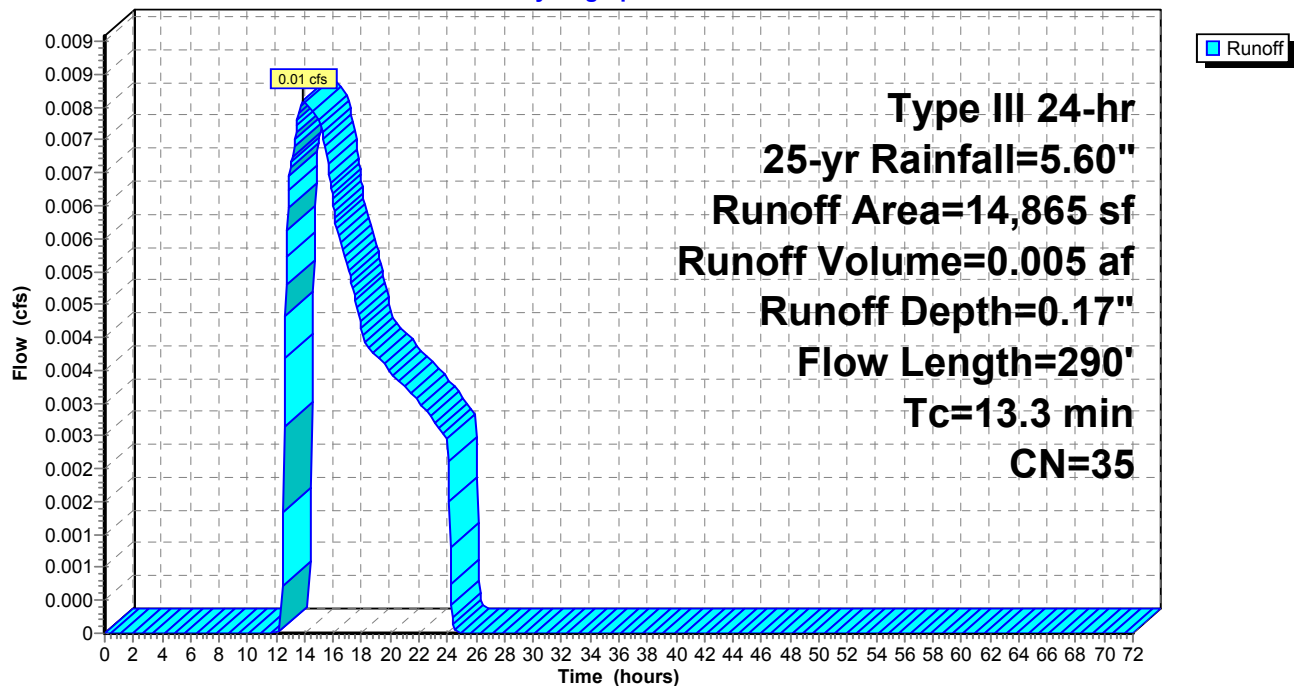
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.60"

Area (sf)	CN	Description
5,946	30	Woods, Good, HSG A
8,919	39	>75% Grass cover, Good, HSG A
14,865	35	Weighted Average
14,865		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment P3: SE Property

Hydrograph

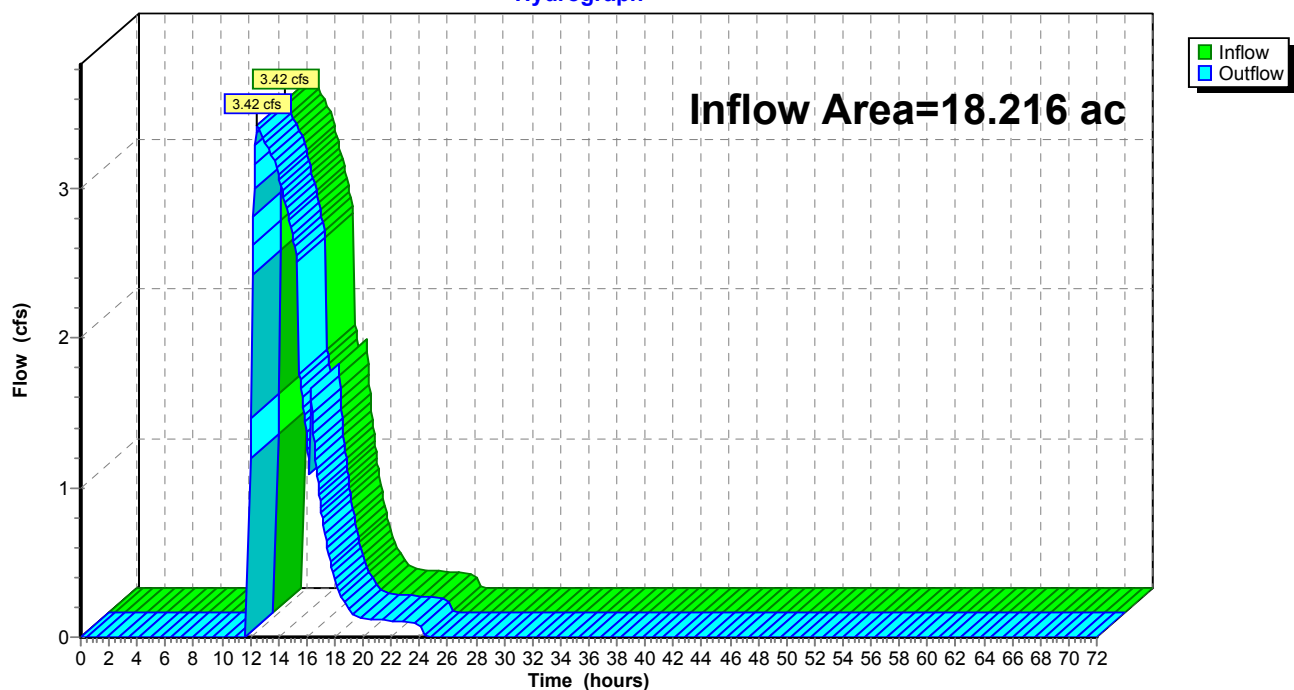


Summary for Reach DP-1: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.216 ac, 25.94% Impervious, Inflow Depth = 0.75" for 25-yr event
Inflow = 3.42 cfs @ 12.53 hrs, Volume= 1.135 af
Outflow = 3.42 cfs @ 12.53 hrs, Volume= 1.135 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

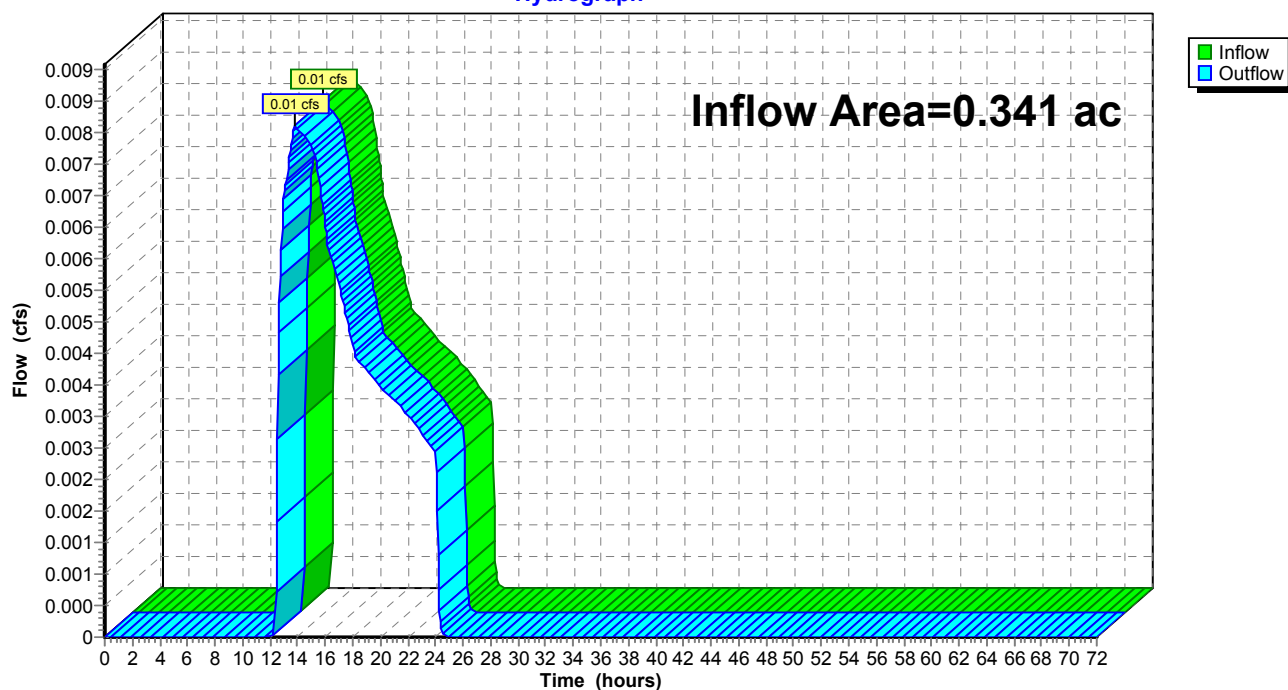
Reach DP-1: Wetland**Hydrograph**

Summary for Reach DP-2: Water St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.341 ac, 0.00% Impervious, Inflow Depth = 0.17" for 25-yr event
Inflow = 0.01 cfs @ 13.86 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 13.86 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St**Hydrograph**

Summary for Pond 1P: Infiltration Pond

Inflow Area = 7.980 ac, 59.22% Impervious, Inflow Depth = 2.85" for 25-yr event
 Inflow = 30.64 cfs @ 12.00 hrs, Volume= 1.896 af
 Outflow = 3.11 cfs @ 12.78 hrs, Volume= 1.896 af, Atten= 90%, Lag= 46.5 min
 Discarded = 0.71 cfs @ 11.25 hrs, Volume= 0.921 af
 Primary = 3.11 cfs @ 12.78 hrs, Volume= 0.976 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.89' @ 12.78 hrs Surf.Area= 18,979 sf Storage= 35,905 cf

Plug-Flow detention time= 221.7 min calculated for 1.895 af (100% of inflow)
 Center-of-Mass det. time= 221.8 min (1,048.3 - 826.4)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	75,823 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	12,792	0	0
10.00	13,508	6,575	6,575
11.00	14,981	14,245	20,820
12.00	19,481	17,231	38,051
13.00	21,280	20,381	58,431
13.80	22,200	17,392	75,823

Device	Routing	Invert	Outlet Devices
#1	Primary	10.80'	2.0' long x 2.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Device 1	9.75'	12.0" Round Culvert L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 9.75' / 9.29' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Discarded	9.50'	Special & User-Defined Head (feet) 0.00 0.10 1.00 1.50 1.69 1.70 4.00 Disch. (cfs) 0.000 0.714 0.714 0.714 0.714 0.000 0.000

Discarded OutFlow Max=0.71 cfs @ 11.25 hrs HW=9.63' (Free Discharge)

↑ **3=Special & User-Defined** (Custom Controls 0.71 cfs)

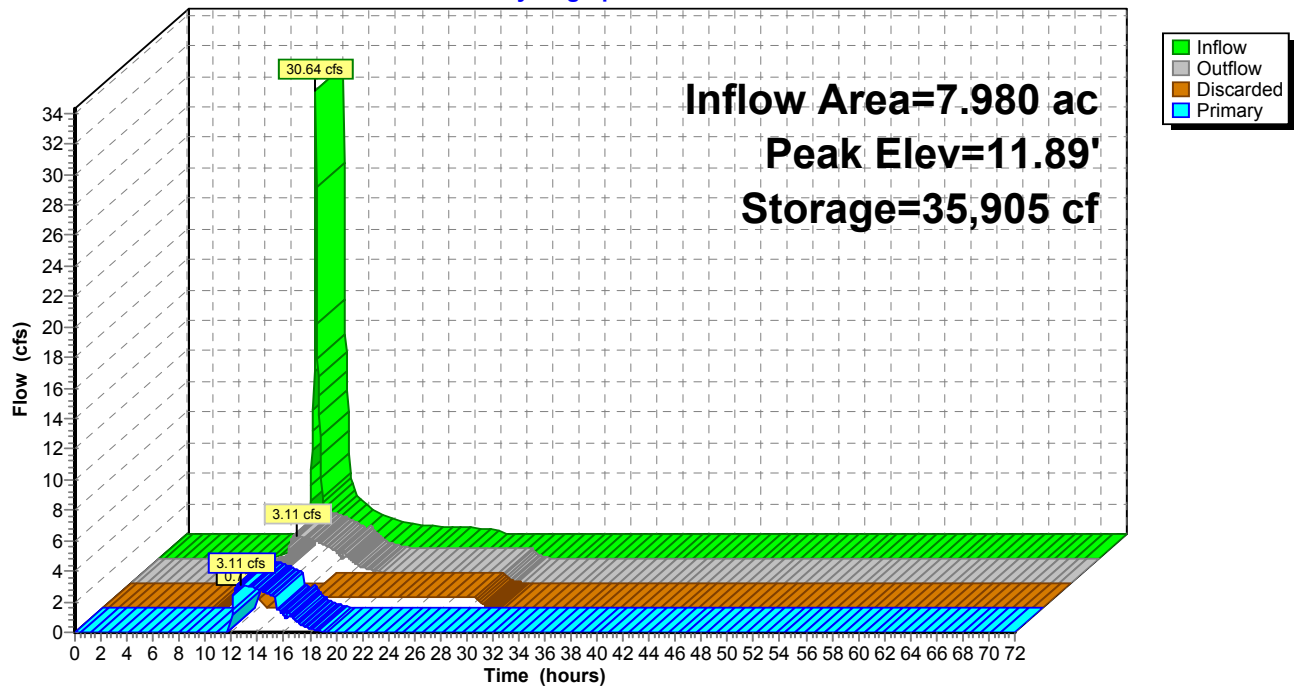
Primary OutFlow Max=3.11 cfs @ 12.78 hrs HW=11.89' (Free Discharge)

↑ **1=Sharp-Crested Rectangular Weir** (Passes 3.11 cfs of 6.62 cfs potential flow)

↑ **2=Culvert** (Inlet Controls 3.11 cfs @ 3.97 fps)

Pond 1P: Infiltration Pond

Hydrograph



215-181 Post-DEV*Type III 24-hr 100-yr Rainfall=7.00"*

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Page 33

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentP1: SW Property

Runoff Area=190,029 sf 0.00% Impervious Runoff Depth=0.70"
Flow Length=400' Tc=12.0 min CN=38 Runoff=1.40 cfs 0.253 af

SubcatchmentP2: Central Overland

Runoff Area=255,881 sf 0.00% Impervious Runoff Depth=0.37"
Flow Length=190' Tc=17.0 min CN=33 Runoff=0.53 cfs 0.182 af

SubcatchmentP2a: Developed Site

Runoff Area=347,600 sf 59.22% Impervious Runoff Depth=4.04"
Tc=0.0 min CN=74 Runoff=43.44 cfs 2.688 af

SubcatchmentP3: SE Property

Runoff Area=14,865 sf 0.00% Impervious Runoff Depth=0.49"
Flow Length=290' Tc=13.3 min CN=35 Runoff=0.06 cfs 0.014 af

Reach DP-1: Wetland

Inflow=5.89 cfs 2.221 af
Outflow=5.89 cfs 2.221 af

Reach DP-2: Water St

Inflow=0.06 cfs 0.014 af
Outflow=0.06 cfs 0.014 af

Pond 1P: Infiltration Pond

Peak Elev=12.76' Storage=53,316 cf Inflow=43.44 cfs 2.688 af
Discarded=0.71 cfs 0.902 af Primary=4.18 cfs 1.785 af Outflow=4.18 cfs 2.688 af

Total Runoff Area = 18.558 ac Runoff Volume = 3.137 af Average Runoff Depth = 2.03"
74.54% Pervious = 13.832 ac 25.46% Impervious = 4.725 ac

215-181 Post-DEV

Type III 24-hr 100-yr Rainfall=7.00"

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Page 34

Summary for Subcatchment P1: SW Property

Runoff = 1.40 cfs @ 12.37 hrs, Volume= 0.253 af, Depth= 0.70"

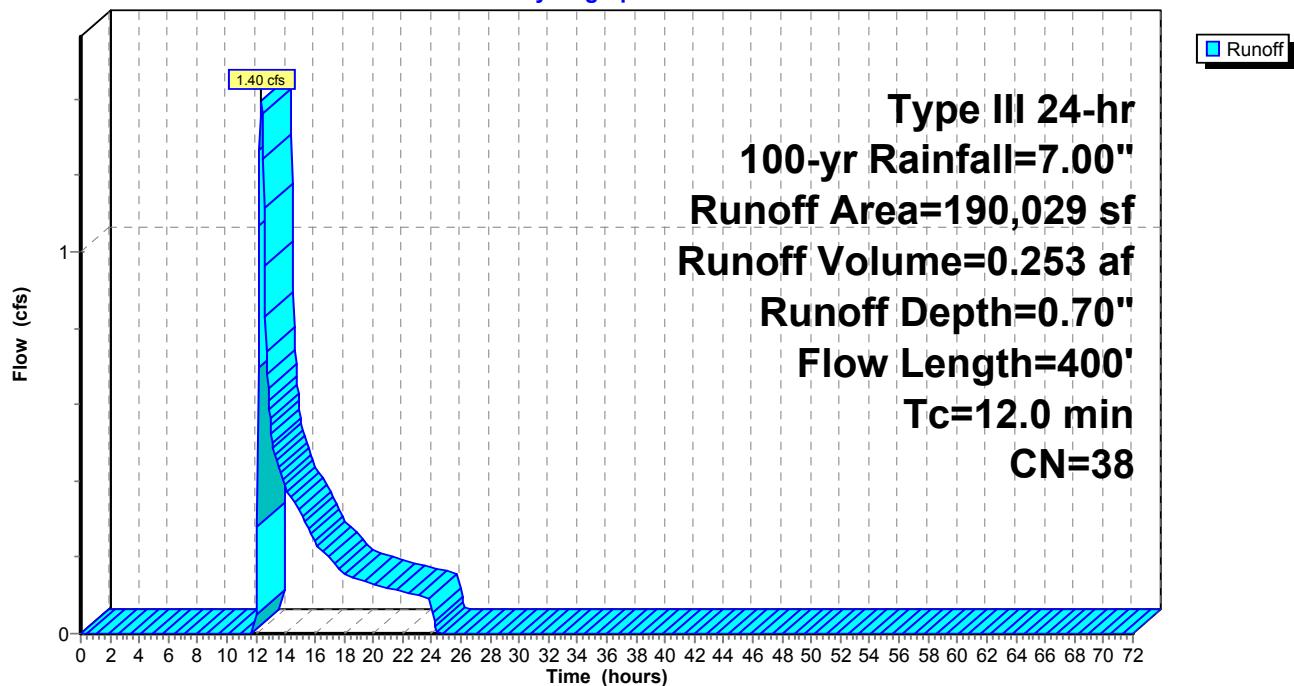
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
151,064	36	Woods, Fair, HSG A
33,865	39	>75% Grass cover, Good, HSG A
5,100	76	Gravel roads, HSG A
190,029	38	Weighted Average
190,029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	50	0.0300	0.08		Sheet Flow, START off property
1.8	350	0.0410	3.26		Woods: Light underbrush n= 0.400 P2= 3.40"
					Shallow Concentrated Flow, To Wetland
					Unpaved Kv= 16.1 fps
12.0	400	Total			

Subcatchment P1: SW Property

Hydrograph



215-181 Post-DEV

Type III 24-hr 100-yr Rainfall=7.00"

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Page 35

Summary for Subcatchment P2: Central Overland

Runoff = 0.53 cfs @ 12.58 hrs, Volume= 0.182 af, Depth= 0.37"

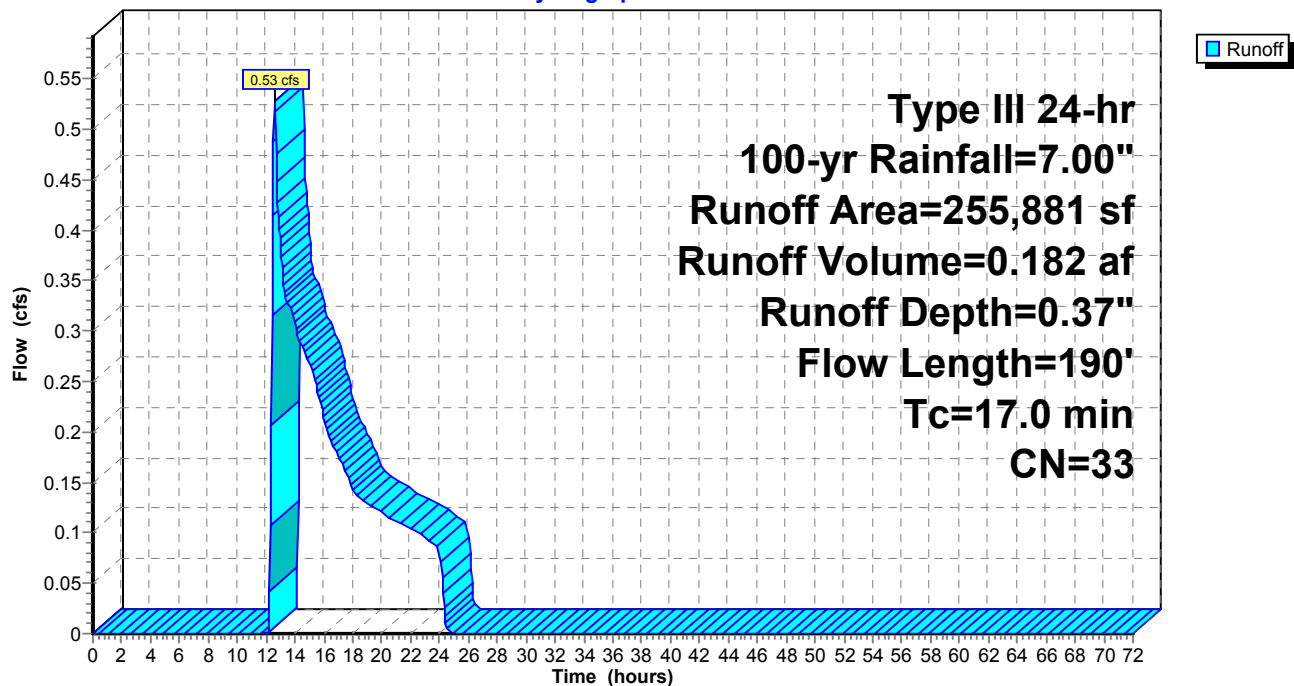
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
183,339	30	Woods, Good, HSG A
71,317	39	>75% Grass cover, Good, HSG A
1,225	76	Gravel roads, HSG A
255,881	33	Weighted Average
255,881		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.2	140	0.0150	1.97		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
17.0	190	Total			

Subcatchment P2: Central Overland

Hydrograph



Summary for Subcatchment P2a: Developed Site

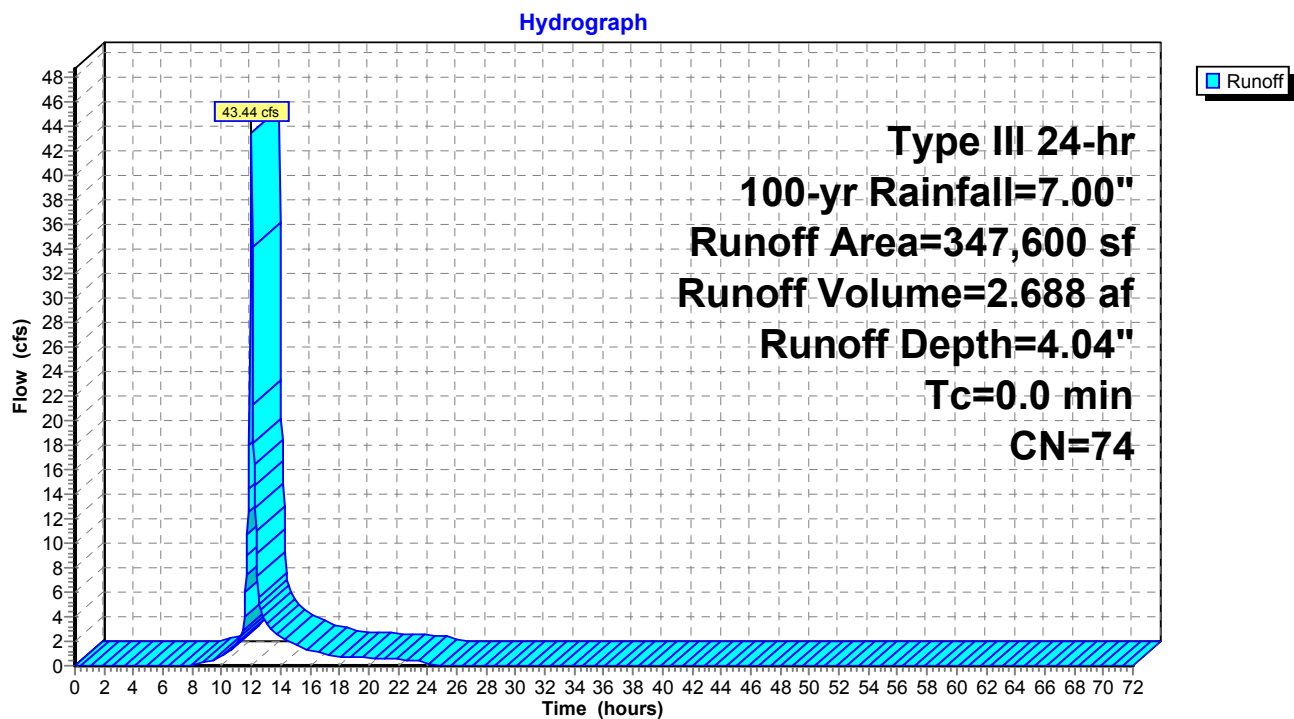
[46] Hint: $T_c=0$ (Instant runoff peak depends on dt)

Runoff = 43.44 cfs @ 12.00 hrs, Volume= 2.688 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, $dt=0.05$ hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
141,768	39	>75% Grass cover, Good, HSG A
103,305	98	Paved parking, HSG A
102,527	98	Roofs, HSG A
347,600	74	Weighted Average
141,768		40.78% Pervious Area
205,832		59.22% Impervious Area

Subcatchment P2a: Developed Site



215-181 Post-DEV

Type III 24-hr 100-yr Rainfall=7.00"

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Page 37

Summary for Subcatchment P3: SE Property

Runoff = 0.06 cfs @ 12.47 hrs, Volume= 0.014 af, Depth= 0.49"

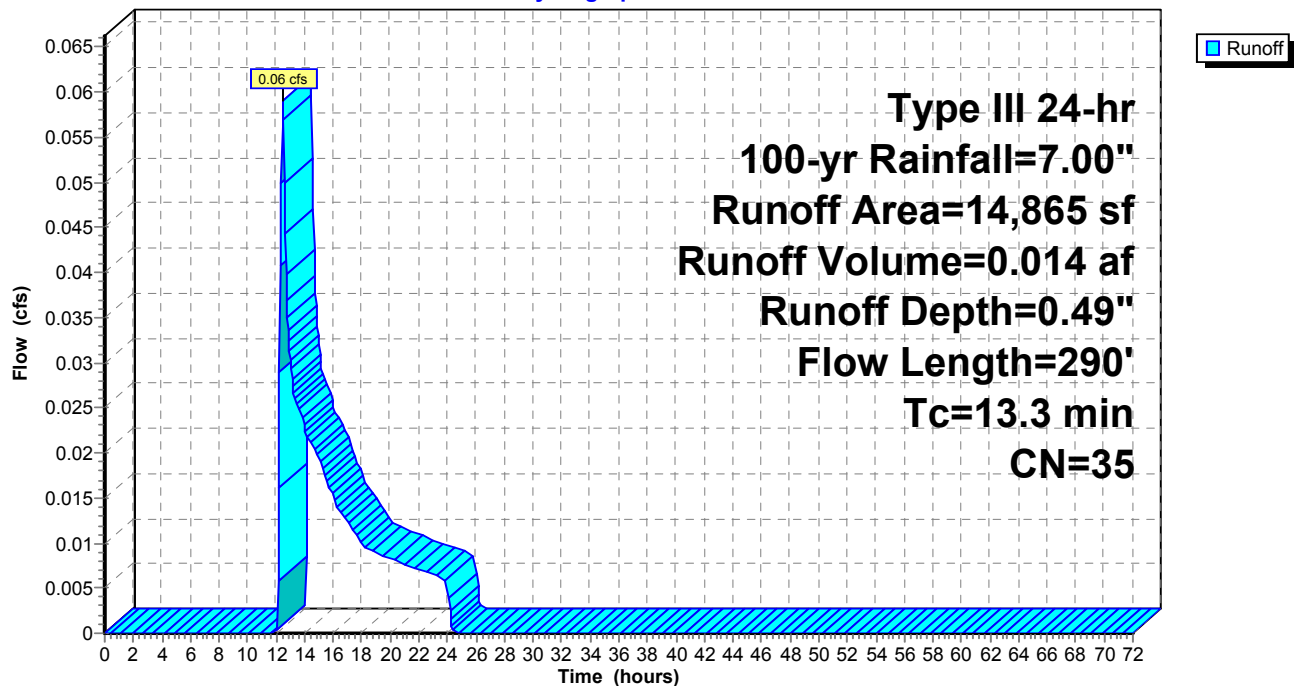
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
5,946	30	Woods, Good, HSG A
8,919	39	>75% Grass cover, Good, HSG A
14,865	35	Weighted Average
14,865		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	50	0.0220	0.07		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.40"
1.8	240	0.0200	2.28		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.3	290	Total			

Subcatchment P3: SE Property

Hydrograph

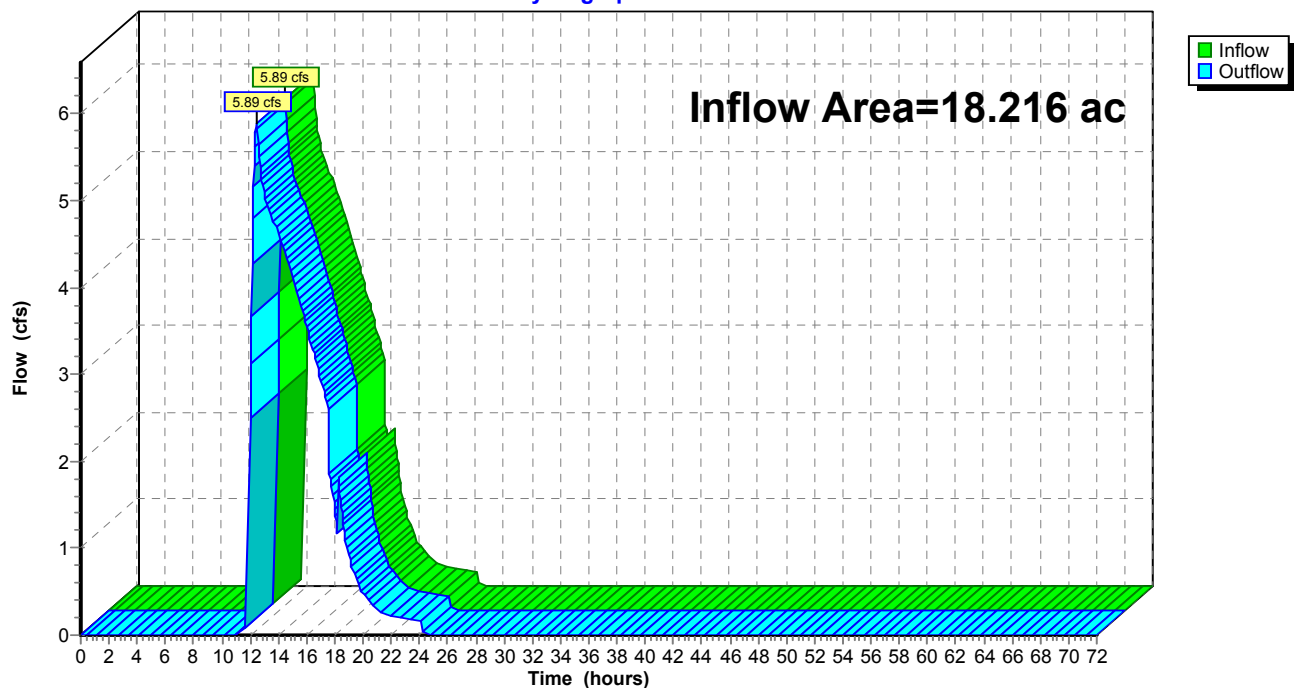


Summary for Reach DP-1: Wetland

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18.216 ac, 25.94% Impervious, Inflow Depth = 1.46" for 100-yr event
Inflow = 5.89 cfs @ 12.47 hrs, Volume= 2.221 af
Outflow = 5.89 cfs @ 12.47 hrs, Volume= 2.221 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

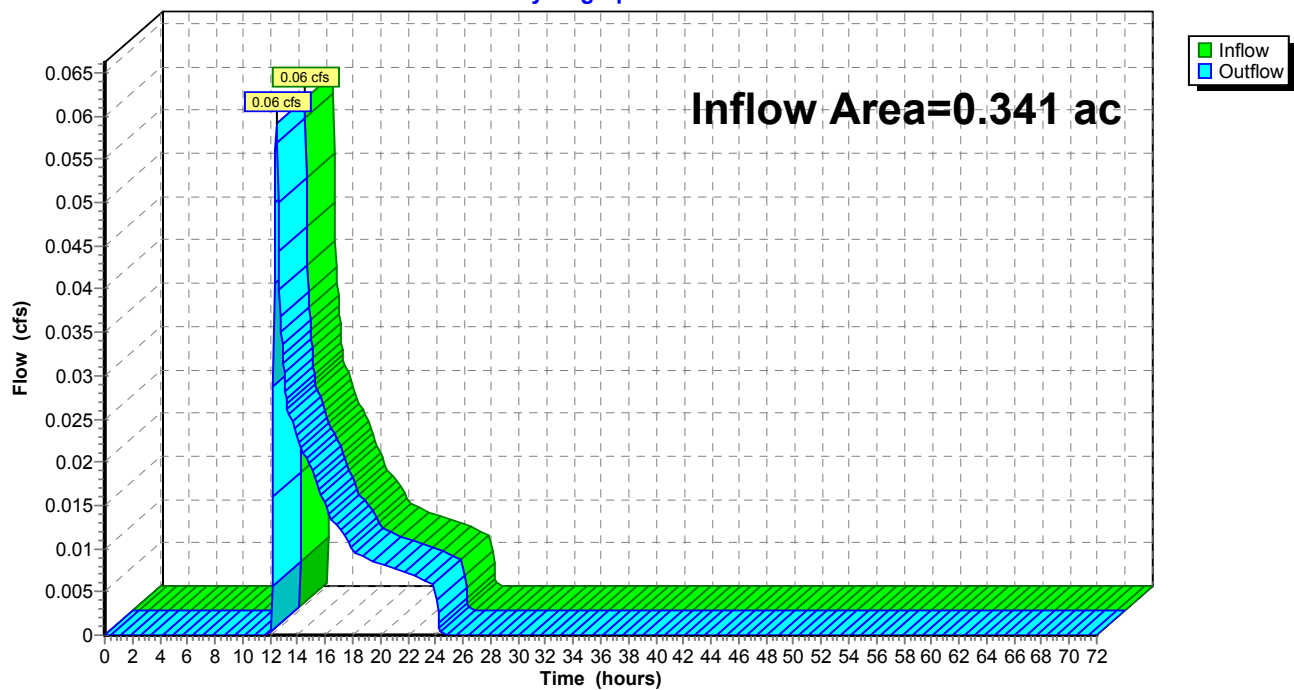
Reach DP-1: Wetland**Hydrograph**

Summary for Reach DP-2: Water St

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.341 ac, 0.00% Impervious, Inflow Depth = 0.49" for 100-yr event
Inflow = 0.06 cfs @ 12.47 hrs, Volume= 0.014 af
Outflow = 0.06 cfs @ 12.47 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP-2: Water St**Hydrograph**

Summary for Pond 1P: Infiltration Pond

Inflow Area = 7.980 ac, 59.22% Impervious, Inflow Depth = 4.04" for 100-yr event
 Inflow = 43.44 cfs @ 12.00 hrs, Volume= 2.688 af
 Outflow = 4.18 cfs @ 12.79 hrs, Volume= 2.688 af, Atten= 90%, Lag= 47.3 min
 Discarded = 0.71 cfs @ 10.60 hrs, Volume= 0.902 af
 Primary = 4.18 cfs @ 12.79 hrs, Volume= 1.785 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 12.76' @ 12.79 hrs Surf.Area= 20,843 sf Storage= 53,316 cf

Plug-Flow detention time= 215.3 min calculated for 2.686 af (100% of inflow)
 Center-of-Mass det. time= 215.5 min (1,031.9 - 816.4)

Volume	Invert	Avail.Storage	Storage Description
#1	9.50'	75,823 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
9.50	12,792	0	0
10.00	13,508	6,575	6,575
11.00	14,981	14,245	20,820
12.00	19,481	17,231	38,051
13.00	21,280	20,381	58,431
13.80	22,200	17,392	75,823

Device	Routing	Invert	Outlet Devices
#1	Primary	10.80'	2.0' long x 2.00' rise Sharp-Crested Rectangular Weir 2 End Contraction(s)
#2	Device 1	9.75'	12.0" Round Culvert L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 9.75' / 9.29' S= 0.0100 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Discarded	9.50'	Special & User-Defined Head (feet) 0.00 0.10 1.00 1.50 1.69 1.70 4.00 Disch. (cfs) 0.000 0.714 0.714 0.714 0.714 0.000 0.000

Discarded OutFlow Max=0.71 cfs @ 10.60 hrs HW=9.63' (Free Discharge)

↑**3=Special & User-Defined** (Custom Controls 0.71 cfs)

Primary OutFlow Max=4.18 cfs @ 12.79 hrs HW=12.76' (Free Discharge)

↑**1=Sharp-Crested Rectangular Weir** (Passes 4.18 cfs of 14.40 cfs potential flow)

↑**2=Culvert** (Inlet Controls 4.18 cfs @ 5.32 fps)

Pond 1P: Infiltration Pond

Hydrograph

